

RECORD OF DECISION

Hooker Chemical/Ruco Polymer Superfund Site

Town of Oyster Bay, Hicksville Nassau County, New York



United States Environmental Protection Agency
Region II
New York, New York
September 2000

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Hooker Chemical/Ruco Polymer Superfund Site Town of Oyster Bay, Hicksville, Nassau County, New York

Superfund Site Identification Number: EPA ID # NYD002920312 Operable Unit 3

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Hooker Chemical/Ruco Polymer Superfund Site (Hooker/Ruco Site), which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 400. This decision document explains the factual and legal basis for selecting the remedy for this Site.

The New York State Department of Environmental Conservation (NYSDEC) concurs with the selected remedy. A letter of concurrence from the NYSDEC is attached to this document (Appendix IV).

The information supporting this remedial action decision is contained in the administrative record for this Site. The index for the administrative record is attached to this document (Appendix III).

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Hooker/Ruco Site, if not addressed by implementing the response actions selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to the public health or welfare, or to the environment.

DESCRIPTION OF THE SELECTED REMEDY

The remedial action described in this document represents the third remedial phase or operable unit involving the Hooker/Ruco Site. It addresses the downgradient commingled contaminated groundwater plume beyond the Hooker/Ruco Facility and also the contaminated groundwater beneath the Hooker/Ruco Facility which was previously included as part of the first operable unit (OU-1) remedy.

The selected groundwater remedy includes in-situ treatment of the vinyl chloride monomer (VCM) subplume by bioremediation using

biosparging (and supplemental nutrient addition, if necessary) to achieve cleanup standards and prevent the need for supplemental treatment at the downgradient Northrop Treatment System.

The major components of the remedy include:

- The use of biosparging technology in an in-situ application to enhance the VCM degradation with the goal of achieving State drinking water standards or Federal maximum contaminant levels (MCLs). Biosparging is a form of bioremediation that involves the introduction of air/oxygen into the aquifer to increase the dissolved oxygen content in the aquifer, which will enhance aerobic degradation of the VCM subplume.
- Vertical injection wells will be installed in the area of the VCM subplume to a depth of 200 to 400 feet. Additives (air/oxygen, nutrients) will be forced into the formation using either static head within the well or using pump-supplied pressure.
- Vadose zone or unsaturated zone monitoring program will be implemented to ensure that air stripping of VOCs, particularly VCM, is not occurring as a result of biosparging.
- If necessary, the selected remedy will also utilize a supplemental aerobic bioremediation technology following the biosparging treatment. Supplemental bioremediation would involve the injection of nutrients (potentially including nitrogen and phosphorus along with suitable carbon sources such as methane) to enhance the growth and metabolic activities of indigenous microbial populations to effect the degradation of VCM in the aquifer.
- A long-term monitoring program will be developed to monitor groundwater quality in the area of the VCM subplume and to evaluate the fate and migration of VOCs southward and westward beyond the VCM subplume. New monitoring wells would be added to the existing network of monitoring wells to increase the network's area of coverage. The objective of the long-term monitoring program is to evaluate the effectiveness of the selected remedy.

The selected remedy is also based on the recognition that an existing groundwater extraction and treatment system (Northrop Treatment System) which is operating as an Interim Remedial Measure at the downgradient Northrop/Grumman Aerospace Corporation (Northrop) Site is containing and remediating a commingled plume of trichloroethylene (TCE) and perchloroethylene (PCE) contamination from the Northrop, Naval Weapons Industrial

Reserve Plant and the Hooker/Ruco Sites. EPA's selected remedy, designated as Operable Unit Three (OU-3), together with the Northrop Treatment System, which is expected to continue to operate for at least the next thirty years, will prevent further migration of groundwater contamination and will effectively address the contamination emanating from the Hooker/Ruco Facility.

If it is determined during the implementation and long-term monitoring of the selected remedy that the technology selected is not effective in adequately reducing the VCM concentrations in a reasonable time frame, then VCM subplume extraction and treatment would be implemented as a contingency remedy. Further, if either the Northrop treatment system or the VOC removal system ceases operation before the regional aquifer is restored, or if the Northrop Treatment System is not capturing contaminants emanating from the Hooker/Ruco Facility, EPA would re-evaluate the protectiveness of the selected remedy.

The components of the contingency remedy include:

- Extraction and treatment of groundwater within the area of the VCM subplume with a goal of achieving State drinking water standards or Federal MCLs.
- Extraction wells would be placed in the area of highest concentration of VCM and at the leading edge of the VCM subplume.
- The extracted water would be sent to an air stripping treatment system, which will be constructed within the vicinity of the Hooker/Ruco Facility.
- The treated effluent would be discharged to a recharge basin on the Hooker/Ruco Facility.
- A long-term monitoring program will be developed to monitor groundwater quality in the area of the VCM subplume and to evaluate the fate and migration of VOCs southward and westward beyond the VCM subplume. New monitoring wells would be added to the existing network of monitoring wells to increase the network's area of coverage. The objective of the long-term monitoring program would be to evaluate the effectiveness of the selected contingency remedy.

The Remedial Action Objectives for groundwater are to protect human health from exposure (via ingestion, inhalation, and dermal contact) to VCM, TCE, PCE and tentatively identified compounds (TICs) in groundwater at concentrations in excess of New York State groundwater standards and Federal MCLs and also to restore the aquifer to meet New York State Groundwater Standards and New York State and Federal MCLs in a timely manner.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in CERCLA \$121, 42 U.S.C. \$9621. It is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The selected remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume of contaminants as their principal element.

Because this remedy will result in hazardous substances remaining at the Site above levels that allow for unlimited use of and unrestricted exposure to the Site, a review will be conducted at least once every five years after commencement of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

The ROD contains the remedy selection information noted below. More details may be found in the Administrative Record file for this site.

- Chemicals of concern and their respective concentrations (see ROD, pages 14-16);
- Baseline risk represented by the chemicals of concern (see ROD, pages 16-22);
- Cleanup levels established for chemicals of concern and the basis for these levels (see ROD, pages 21 and Appendix II);
- Current and reasonably-anticipated future land use assumptions and current and potential future beneficial uses of groundwater considered in the baseline risk assessment and ROD (see ROD, pages 17-19);
- How source materials constituting principal threats are addressed (see page 30);

- Potential land and groundwater use that will be available at the Site as a result of the selected remedy (see ROD, pages 32-35);
- Estimated capital, annual operation and maintenance, and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (see ROD, page 31); and
- Key factors that led to selecting the remedy (i.e., how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) (see ROD, pages 36-40).

Regional Administrator

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SITE NAME, LOCATION AND DESCRIPTION

The Hooker Chemical/Ruco Polymer Site (Hooker/Ruco Site) is located off of New South Road in Hicksville, Town of Oyster Bay, Nassau County, New York, approximately 25 miles east of New York City (see Figure 1, which is a compilation of several United States Geological Survey (USGS) topographic maps showing the Hooker/Ruco Site and its surroundings). The Hooker/Ruco Site includes an active chemical manufacturing facility in a heavily industrialized section of Hicksville. The facility (Hooker/Ruco Facility or Facility), which is currently owned and operated by Sybron Chemicals, Inc., contains six buildings used for the manufacture and storage of chemical products (Plants 1,2,3, the Pilot Plant, a warehouse, and an administration building) (see Figure 2). The remainder of the 14-acre facility contains parking areas, chemical storage tanks, four recharge basins (sumps) and small ancillary buildings. The facility currently employs approximately 100 people.

Historically, the two major industrial facilities in the area of the Hooker/Ruco Site were the Northrop Grumman Aerospace Corporation (Northrop) and the Naval Weapons Industrial Reserve Plant (NWIRP). The NWIRP, which is within the footprint of the Northrop complex, is now shut down and the Northrop operations are substantially downsized. Northrop and the U.S. Navy are both in the process of transferring parcels of their property to other parties. There are many other small industries, commercial operations, residential areas, utilities, transportation corridors, and storm-water management basins in the area.

Commerce Street and adjacent industrial development comprise the 880-foot northern Hooker/Ruco Facility boundary. Along the Facility's 1,000-foot eastern side is a large warehouse building formerly-owned by Northrop. A small portion of undeveloped land abuts the Hooker/Ruco Facility's 250-foot southern property boundary. Two active tracks of the Long Island Railroad parallel the Hooker/Ruco Facility's 940-foot southwestern property boundary. The Hooker/Ruco Facility is bounded on its 270-foot western boundary by New South Road. The property is enclosed by a chain-link fence. Four surface-water sumps are located on the Hooker/Ruco Facility along the eastern property boundary.

The area surrounding the Hooker/Ruco Site also includes residential complexes. Residential dwellings comprise approximately 22 percent of the area and are located southwest of the Hooker/Ruco Facility. Approximately 65 percent of the area land use is industrial or commercial.

SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

Site remediation activities are sometimes segregated into different phases, or operable units (OUs), so that remediation of different environmental media or areas of a site can proceed separately, resulting in an expeditious remediation of the entire site. EPA has designated three separate distinct phases or OUs for this site. The OUs for this Site are divided as follows:

- OU-1: Addresses the majority of the Ruco property soil contamination.
- O OU-2: Addressed the PCB-contaminated soils.
- OU-3: Addresses the downgradient commingled contaminated groundwater plume beyond the Hooker/Ruco Facility and the contaminated groundwater beneath the Hooker/Ruco Facility which was previously included under OU-1.

Subsequent to EPA's issuance of the January 1994 Record of Decision (ROD) for OU-1, which called for soil flushing and extraction and treatment of groundwater beneath the Hooker/Ruco Facility, the Northrop Treatment System and the coordinated groundwater investigations were completed. Based on the results of the groundwater investigations, which included sampling and analysis of wells beyond the Hooker/Ruco Facility, EPA reevaluated the need to extract the groundwater at the Hooker/Ruco Facility boundary. OU-3 now addresses the downgradient commingled contaminated groundwater plume beyond the Hooker/Ruco Facility and also the contaminated groundwater beneath the Hooker/Ruco Facility which was previously included under OU-1. The soil flushing component of the OU-1 ROD will be implemented. The source of water to be used for soil flushing will no longer be from an extraction and treatment system.

The primary objectives of the remedial action described in this ROD are to reduce contaminant levels in groundwater to achieve State drinking water standards or Federal MCLs; to prevent the need for supplemental treatment at the Northrop Treatment System; and to protect human health and the environment from risks associated with the contaminated groundwater.

HOOKER/RUCO SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Hooker/Ruco Site was developed by the Rubber Corporation of America, a small, privately-held company. Operations at the Hooker/Ruco Site began in 1945 and included natural latex

storage, concentration and compounding. Five years later, the company began producing small volumes of plasticizers. activities were expanded and modified throughout the years. 1956, a polyvinyl chloride (PVC) plant was built and was initially operated under the name of Insular Chemical Corporation. At that time, the two companies, Insular Chemical Corporation and the Rubber Company of America occupied the Hooker/Ruco Site. Although they were two separate corporations, they shared the same pilot plant. The two companies eventually merged into the Rubber Corporation of America. In 1965, the company was purchased by the Hooker Chemical Company (currently known as the Occidental Chemical Corporation or Occidental) and was known and operated as the Ruco Division. In 1982, the employees of the Ruco Division bought the company from Occidental and it became known as the Ruco Polymer Corporation (not affiliated with Occidental). In 1998, Sybron Chemicals Inc., acquired the Ruco Polymer Corporation. The facility is currently used for the production of various polymers, PVC, styrene/butadiene latex, vinyl chloride/vinyl acetate copolymer, and polyurethane, as well as ester plasticizers.

During Hooker/Ruco Site operations between 1956 and 1975, industrial process wastewater and storm water runoff from the facility was discharged to six on-Site recharge basins or sumps. This wastewater contained, among other things, vinyl chloride, trichloroethylene, barium and cadmium soap, vinyl acetate, organic acids, and styrene condensate. Drums containing various chemicals were also stored on-Site where occasional spills would occur. As a result of these releases, groundwater beneath and downgradient from the Hooker/Ruco Site has been contaminated. Limited areas of residual soils contamination exist above levels that would be considered protective of groundwater quality. Currently, only noncontact cooling water is discharged into one sump (No. four) and a sump that collects surface water run-off (No. three). From 1975 to 1991, a concrete settling basin was used to store ester waste prior to being incinerated on-Site. Ester wastes are presently stored in an on-Site, aboveground tank prior to off-Site disposal or incineration on-Site. Hazardous wastes are stored in drums on-Site until they are disposed of at a permitted off-Site facility.

From 1946 to 1978, the pilot plant used a heat transfer fluid called Therminol, which contained PCBs. During this period of operation of the facility, there was a release of Therminol to the soil adjacent to the pilot plant. Some of this contaminated soil was spread to surrounding areas by surface water runoff, sediment transport, and truck traffic.

Initial investigations by Occidental were started at the Hooker/Ruco Site in 1978. Originally, efforts were directed towards understanding past manufacturing processes, waste generation and disposal. A Site background report was prepared This report presented the Site in the context of its surroundings and examined waste disposal, regional geology and hydrogeology, regional water withdrawals and water quality. that time, the New York State Department of Environmental Conservation (NYSDEC) was the lead government agency. plan for conducting a soil and groundwater investigation was submitted to the NYSDEC in 1983. This work plan was approved in 1983 and the investigation commenced. The investigation consisted of installing and sampling six groundwater monitoring well clusters at locations downgradient of suspected areas of waste disposal, the drilling and sampling of two deep test borings in formerly active sumps, and drilling and sampling four shallow borings in the vicinity of the reported Therminol spill. The results of this study were presented in a report entitled "Report of Groundwater & Soils Investigation at the Former Ruco Division Plant Site, Hicksville, New York" dated August 1984.

These initial investigations led to the Hooker/Ruco Site being placed on the National Priorities List (NPL) in 1984.

From March 1985 to September 1988 a series of investigations were conducted in an attempt to further define the nature and extent of the contamination at the Hooker/Ruco Site.

In July 1988, EPA notified Occidental and Ruco Polymer of their potential liability and offered them the opportunity to conduct a Remedial Investigation and Feasibility Study (RI/FS). In September 1988, Occidental agreed to perform the RI/FS and entered into an Administrative Order on Consent with EPA. In September 1989, RI/FS field work commenced. Field work was completed in February 1990 and a draft RI Report was submitted in April 1990. Portions of the RI Report pertaining to the PCB-contaminated areas were approved to expedite the remediation of those areas. Based on the partially approved RI Report, a Focused Feasibility Study (FFS) was prepared by Occidental and approved by EPA in August 1989.

A ROD for OU-2 which addressed a PCB-contaminated area surrounding the pilot plant building and a portion of sump No. three, was issued by EPA on September 28, 1990. A Special Notice letter for implementation of the OU-2 remedial design/remedial action (RD/RA) was sent to Occidental and Ruco Polymer on December 20, 1990. An Administrative Order was issued unilaterally by EPA to Occidental and Ruco Polymer on June 27,

1991. Notices of Intent to Comply with the Order were submitted by both Occidental and Ruco Polymer on July 17, 1991.

Occidental has assumed responsibility for the OU-2 RD/RA. Mobilization for the performance of the OU-2 RA took place on May 4, 1992. Field operations for the work were monitored by an EPA oversight contractor. A notice of Final Inspection was received by EPA on July 22, 1992. EPA inspected the Site on September 3, 1992 and concluded that the remedial action was completed. Occidental's Remedial Action Report was approved on March 12, 1993. This concluded the activities associated with OU-2. The remainder of the RI report was approved in December of 1992.

In January 1994, also based on the results of the 1992 RI, EPA issued a second ROD (OU-1) which called for additional soil sampling, excavation of shallow soils in limited areas and soil flushing with extraction and treatment of contaminated groundwater beneath the Hooker/Ruco Facility. EPA unilaterally issued an administrative order to implement the OU-1 ROD. A predesign Workplan for addressing the soil component of the OU-1 ROD is being prepared to better delineate the soil areas to be flushed. Thereafter, EPA and NYSDEC began to reevaluate the remedial approach for groundwater under the OU-1 ROD.

In April 1994, under EPA's direction, Occidental initiated a program to further investigate groundwater conditions beyond the Hooker/Ruco Facility which involved collecting additional groundwater data around and primarily west of the Hooker/Ruco Facility. These activities are described in the document entitled "Work Plan for Groundwater Investigations Beyond the Hooker/Ruco Facility, August 1994" and in a subsequent Addendum, dated September 1995.

Since the groundwater contamination associated with the Hooker/Ruco Facility has commingled with groundwater contamination from the Northrop and NWIRP sites, in the Spring of 1995, EPA and NYSDEC agreed to proceed with a coordinated effort to evaluate and develop remedial alternatives to address the commingled plume.

The Northrop Site

The Northrop site was initially more than 600 acres in area. However, as a result of several remedial activities taken at the Northrop Site, NYSDEC has reclassified some portions of the site and delisted other portions of the site from the New York State Registry of Inactive Hazardous Waste Disposal Sites.

The Northrop plant was established in the early 1930's and developed and manufactured a series of naval carrier aircraft, amphibious vehicles and space exploration vehicles. The main activities of this facility were the engineering, manufacturing, primary assembly, and research, development and testing of a variety of military and aerospace crafts. The plant is presently undergoing closure operations. The facility included numerous buildings and seven industrial production wells. The recharge basins located in the southern end of the property received treated industrial wastewater from the late 1940's until 1981. Since 1981, treated wastewater has been discharged to a sanitary sewer and the recharge basins have been used to discharge only non-contact cooling water and storm water runoff. Discharges to the on-Site recharge basins are regulated in accordance with a State Pollutant Discharge Elimination System (SPDES) permit. Between 1996 and 1998, a soil vapor extraction (SVE) system was operating on a portion of the Northrop site in order to remediate the soil. An RI was conducted at the Northrop site between 1991 The RI included the investigation of chemical and waste storage and disposal areas.

Naval Weapons Industrial Reserve Plant (NWIRP)

The NWIRP facility was established within the Northrop site during the early 1930's. Historically, this was a government-owned and contractor-operated facility with the mission of design engineering, research prototyping, testing, fabrication and primary and subassembly of various naval aircraft. Several waste source areas were identified at the site during an investigation, which was conducted from 1991 to 1995. Currently, air sparging technology and an SVE system are being operated at the NWIRP site for soil remediation.

Coordinated Groundwater Investigation

EPA and NYSDEC have identified that the regional groundwater aquifer in the area downgradient of the Hooker/Ruco Facility has also been contaminated by the Northrop and the NWIRP sites. These two facilities are designated as NYSDEC hazardous waste sites. Northrop is a potentially responsible party (PRP) for the Northrop site and the National Division Naval Facilities Engineering Command (the U.S. Navy) is a PRP for the NWIRP site. Figure 3 provides an outline of the Hooker/Ruco, Northrop and NWIRP facilities. Northrop has signed a Consent Order and the U.S. Navy has signed a Memorandum of Understanding with NYSDEC for the performance of an RI/FS at their respective facilities. The RIs for the Northrop and NWIRP sites were completed in September 1994 and October 1993, respectively. Based on the findings of these reports, Northrop and the U.S. Navy have

implemented two groundwater interim remedial measures. One measure provides for VOC removal and treatment at the Bethpage Water District wells downgradient of the Northrop/NWIRP sites. The second measure consists of pumping and treatment of groundwater from four wells (GP-1, ONCT-1, 2 & 3) at the Northrop facility and includes a long-term groundwater monitoring program.

While EPA and NYSDEC have conducted independent investigations of the source areas at each of the three sites, the Agency and the State have coordinated the investigation of the regional groundwater contamination to avoid duplication of effort. The regional groundwater contaminant plume contains VOCs which are related to past waste disposal at each of the facilities and which have commingled. Based on the available data, the Northrop, NWIRP and Hooker/Ruco facilities are sources of TCE, perchloroethylene (PCE), vinyl chloride monomer (VCM), semivolatile organic compounds (SVOCs) and inorganics. source of VCM, however, is attributed to historic wastewater discharges from the Hooker Ruco Facility. In the Spring of 1995, EPA and NYSDEC agreed to proceed with a coordinated effort to evaluate and develop remedial alternatives to address the commingled plume. In November 1998, EPA directed Occidental to prepare an FS which addressed the VCM subplume within the regional groundwater plume and NYSDEC directed Northrop and NWIRP to prepare an FS to address the remainder of the regional VOC groundwater plume. It is noted that the decision to approach remediation of the regional plume in this manner was based on administrative and not technical considerations. In the Fall of 2000, NYSDEC intends to issue a Proposed Plan which, in addition to addressing the regional groundwater contamination, will identify source control measures for the Northrop and NWIRP The FS prepared by Occidental for addressing the VCM subplume was completed in July 2000.

The RI/FS Reports for Operable Unit 3 (OU-3), the OU-3 Proposed Plan and Responsiveness Summary, along with other Site-related documents, provide the basis for this Record of Decision.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The OU-3 RI/FS Reports and the Proposed Plan for the Site were released to the public for comment on July 28, 2000. These documents, as well as other documents in the Administrative Record (see Administrative Record Index, Appendix III) have been made available to the public at two information repositories maintained at the EPA Docket Room in Region II, New York, NY and the Hicksville Public Library, located at 169 Jerusalem Avenue, Hicksville, NY. A public notice announcing the public meeting on the Proposed Plan as well as the availability of the above-

referenced documents was published in *Newsday* on July 28, 2000. The public notice established a thirty-day comment period.

The public meeting was held at the Oyster Bay Town Hall, located at 54 Audrey Avenue, Oyster Bay, New York to present the Proposed Plan to interested citizens and to address any questions concerning the Plan and other details related to the RI/FS Reports. Responses to the comments and questions received at the public meeting, along with other written comments received during the public comment period, are included in the Responsiveness Summary (see Appendix V).

EPA subsequently received a request for an extension of the public comment period through September 12, 2000. The Agency's decision to extend the comment period was announced at the August 15, 2000 public meeting on the Proposed Plan, as well as publicized through mailings to more than 400 interested parties on the site mailing list.

SUMMARY OF SITE CHARACTERISTICS

As discussed above, a RI was completed in December 1992. As part of the RI, a total of 32 monitoring wells in the immediate vicinity of the Hooker/Ruco Facility were sampled and analyzed. Based on the sampling conducted prior to, and during the RI, the evidence indicates that groundwater beneath the Hooker/Ruco Facility contains chemical constituents above the New York State (NYS) drinking water standards, NYS groundwater quality standards and EPA MCLs. Groundwater containing VCM, PCE, dichloroethylene (DCE), TCE, tentatively identified compounds (TICs) and arsenic is moving downgradient from the Hooker/Ruco Facility.

In April 1994, under EPA's direction, Occidental initiated a program to investigate groundwater conditions beyond the Hooker/Ruco Facility which involved collecting additional groundwater data around and primarily west of the Hooker/Ruco Facility. The activities were described in the document entitled "Work Plan for Groundwater Investigations Beyond the Hooker/Ruco Property, August 1994" and in a subsequent Addendum, dated September 1995.

Since the groundwater contamination associated with the Hooker/Ruco Facility has commingled with groundwater contamination from the Northrop and NWIRP sites, in the Spring of 1995, EPA and NYSDEC agreed to proceed with a coordinated effort to evaluate and develop remedial alternatives to address the commingled plume.

The additional groundwater investigations (see July 2000 RI Report) performed at the Hooker/Ruco Site included the following activities:

- Collection and analysis of 133 hydropunch samples.
- Collection and analysis of 14 wells installed during the Beyond Ruco Property (BRP) investigations at eight different locations plus two wells (MW-50Jl and MW-50J2) installed during the RI.
- Collection and analysis of groundwater samples from Northrop Wells GP-6, GP-8 and GP-14.
- Collection and analysis of 20 existing wells on and in close proximity to the Hooker/Ruco Facility to determine current groundwater chemical concentrations.
- Collection and analysis of groundwater samples from seven wells to determine whether natural attenuation processes (e.g., biodegradation) are contributing to the reduction of groundwater chemical concentrations.

Physical Site Conditions

The 14-acre triangular shaped Hooker/Ruco Facility is composed of parking areas, undeveloped land, industrial buildings and chemical storage structures. As shown on Figure 2, Commerce Street and adjacent industrial development comprise the 880 foot northern Site boundary. Along the Facility's 1,000-foot eastern side is a large warehouse building owned by Northrop. A small portion of undeveloped Northrop land abuts the Facility's 250-foot southern property boundary. Two active tracks of the Long Island Rail Road (LIRR) parallel the Facility's 940-foot southwestern property boundary. The Facility is bounded on the 270-foot western boundary by New South Road. The property line is demarcated by a chain-link fence which completely encompasses the Hooker/Ruco Facility.

Vehicular access to the Site is via New South Road. South and southeast of the parking lot area is approximately 3 acres of undeveloped land. Access to the active areas of the Facility is along a paved roadway passing a security building and freight scales. The paved roadway extends to the central, eastern and southern portions of the Facility.

In addition to vehicular traffic, a spur of the LIRR enters the property's southwestern boundary. The rail spur, once on the Facility, splits into two diverging sidings, one that progresses

east toward the corners of Plants 2 and 3, and the other siding angling south between Plant 1 and the warehouse.

Plant 1, located in the south/central portion on the Facility, is the largest structure, comprising approximately 44,800 square feet. The single-story brick building, built in 1945, consists of manufacturing and latex storage. A small office complex was added to the building's front side in 1964 and houses the plant's engineering division. The northern portion of Plant 1 contains a small laboratory.

Adjacent to, but south of Plant 1, is a warehouse, constructed of sheet metal, installed in 1952 covering approximately 12,000 square feet. The warehouse is used for storage of raw and finished stock. A loading dock for shipping and receiving is located in the northern portion of the building.

Northeast of Plant 1 is a small, approximately 2,300 square foot, brick and sheet metal structure, termed the Pilot Plant. The Pilot Plant, installed in 1945, is an independent facility used to pilot test new/emerging products prior to full production.

The Plant 2 complex is located in the north/central portion of the Facility and is composed of Plant 2, an adjacent tank farm, and a small, 300-square foot refrigerated building, termed the cold room, which was an integral part of the discontinued plastic manufacturing process. Plant 2, built in 1956, is composed of the filter storage and reactor buildings covering approximately 11,000 square feet. The filter storage building in the southern portion of Plant 2 contains offices, a small laboratory and maintenance, with the rotary drier associated with production in the rear of the building. Adjacent, in the northern half of Plant 2, are a series of chemical reactors used in the production stages of manufacturing. Because of the reactor's dimensions, the northern half of Plant 2 is a two-story building.

North of Plant 2 is an above-ground tank farm, previously used to store raw plastic stocks, and currently storing solvents and alcohols. The tank farm consists of a 30,000-gallon, two 25,000-gallon and three 15,000-gallon above ground horizontal storage tanks. These storage tanks are surrounded and separated by a 5-foot earthen dike. Just to the east of the tank farm is the cold room.

Plant 3 is an approximately 10,800-square-foot, two-story, sheet metal building, located in the central portion of the Facility. Plant 3 is primarily used for raw and finished stock storage. Adjacent to Plant 3, along the building's south side, are five 100,000-gallon silos used for product storage.

The administration building is approximately 7,700 square feet and is located along the Facility's northern boundary. The administration building, formerly the plastic research and development complex, has been converted from a laboratory to offices for corporate accounting and production personnel. Use of the rear of the building was discontinued in 1975. With the exception of an ester tank farm, all of the structures at the Facility are currently in use.

Four surface water sump basins are located along the Facility's eastern property boundary. Sumps No. 1 and No. 2 are located in the southern portion of the Facility, southeast of Plant 1. Sump No. 1 is approximately 5 feet deep, has been partially backfilled and contains a series of six concrete settling basins. Sump No. 2 is adjacent to Sump No. 1. Sump No. 3, installed in 1968, is located east of the Pilot Plant and contains surface water derived from plant runoff. Sump No. 4, located east of Plant 2, also contains standing surface water. The interior of Sump No. 4 has been subdivided into three substructures by an earthen dike.

Sumps No. 5 and No. 6 have been backfilled to grade surface and are not topographically represented. Sump No. 6 was approximately 5,000 square feet and square in shape. The sump was located adjacent to Sump No. 4 in the area between Plant 2 and the cold room. Sump No. 5 was a rectangular shaped sump along the Facility's northeastern-most boundary and covered approximately 8,000 square feet.

Water supply at the Facility is now derived from city water mains running beneath the Facility from New South Road. A 150,000-gallon tank and two 400-square-foot cooling water towers are located along the Facility's eastern boundary. Miscellaneous structures, including a pump house and two maintenance garages, are located in the vicinity adjacent to sump No. 3. Electrical power is brought to the Facility via above ground utility poles and below-grade electrical lines. Three transformer vaults distribute the electricity to individual buildings. The transformer vault, adjacent to Plant 1, consists of three transformer banks. The Facility is currently served by a public sanitary sewer system. In the past, septic waste was discharged to on-Site septic systems.

The surface of the Facility slopes gently to the south and is primarily permeable except for the presence of the buildings and limited paved areas. Surface water from precipitation drains from the buildings, paved areas and other areas into a recharge basin (Sump No. 3) located along the eastern edge of the Facility.

Geology and Hydrogeology

There are three major aquifers underlying the Site. These are: the unconfined Upper Glacial aquifer; the semi-confined Magothy aquifer; and, the confined Lloyd Sand aquifer. The total thickness of these three aquifers beneath the Site is approximately 1,200 feet. The two aquifers of environmental concern for this Site are the Upper Glacial and the Magothy; the Lloyd Sand is a deep aquifer (1000 feet) and is not hydrogeologically connected to the above aquifers. Studies have indicated that the Upper Glacial and Magothy aquifers are hydrogeologically connected under the Site. The Magothy aquifer is totally dependent upon downward percolating rainfall and recharge from the overlying Upper Glacial deposits for its replenishment.

The Raritan Formation is an Upper Cretaceous age coastal plain deposit which lies unconformably on the bedrock below and consists of two members. The lower member is the Lloyd Sand, the top of which is about 750 feet below sea level. This is a stratified deposit of sand, gravel, sandy clay, silt and clay generally occurring in discontinuous and lenticular beds. upper member is the Raritan Clay, which is composed of primarily silt and clay, but which has some lenses of sand and clayey sand. The Raritan Clay functions as an aquiclude, separating the ground water within the Lloyd Sand from the groundwater within the overlying Magothy Formation. Beneath the Site, the Lloyd Sand is approximately 200 to 300 feet thick and the relatively impermeable Raritan Clay is approximately 160 feet thick. total formation thickness ranges from 300 to 600 feet and is the deepest unconsolidated deposit beneath the Site.

The Magothy Formation is a thick sequence of Upper Cretaceous age sediments which were deposited upon the underlying Raritan Formation. At the Site, the Magothy Formation is approximately 680 feet thick and is composed of marine and terrestrially deposited, stratified, coastal plain sediments. The sediments are primarily fine sand, clayey sand, silt and clay, but may also contain discontinuous lenses of coarse sand and gravel.

Lying unconformably on the Magothy Formation are glacio-fluvial outwash deposits from the Quaternary Age. These Pleistocene deposits which comprise the Upper Glacial aquifer deposits are approximately 30 to 50 feet thick directly under the Site. The Upper Glacial sediments consist of horizontally stratified beds of fine to coarse sands and gravel. The Magothy and the Upper Glacial aquifers have historically been distinguished by differences in sediment color, texture and composition.

The direction and relatively rapid rate of shallow (near the top of the water table) groundwater flow beneath the Site is southerly. The water table at the Site was found to be between 50 to 60 feet below the surface. Deeper into the Magothy aquifer, the groundwater flow is to the south with an easterly component of flow that results from the influence of high pumping rates at the Northrop site adjacent to the Site.

Groundwater supplies the public and private needs of the entire population of Nassau County. The two most commonly tapped aquifers for water supply purposes are the Upper Glacial and the Magothy. The Magothy aquifer is the primary source of potable drinking water in the area of the Site. Water is pumped from municipal supply wells to the homes and businesses in the vicinity of the Site. The Hicksville, Bethpage and Levittown Water Districts supply the businesses and residents in the vicinity of the Site as well as areas to the south. All of the local public supply wells are advanced to and completed within the Magothy aquifer. The nearest municipal well field is located upgradient at 2,000 feet to the north of the Hooker/Ruco Facility (Hicksville supply wells). The groundwater flow in this area is to the south. Other municipal supply wells are located 3,500 feet to the west (Hicksville supply well) and 6,000 feet to the east (Bethpage supply well). Municipal well fields located downgradient are 5,500 feet southwest (Hicksville and Levittown) and approximately 10,000 feet south-southeast (Bethpage supply wells).

The industrial area, including the Site, as well as the surrounding residential areas are above the groundwater aquifer that supplies the surrounding communities with water. This aquifer is designated as a sole source aquifer.

Ecology

The Hooker/Ruco Facility is fully developed as an industrial facility and is surrounded by industrial and residential properties. There are no natural surface water bodies, wetlands, or sensitive flora or fauna within the Site. The only observed animal life on-Site were Canadian geese, that are nesting in known contaminated areas. However, they are not expected to be part of a higher food chain, and therefore, any impacts to the geese on-Site are not expected to affect the area wildlife population.

The contaminants of concern are located in the groundwater starting at a depth of approximately 50 feet below ground surface. A screening evaluation of ecological risk was conducted as part of the 1992 RI. Through this evaluation, EPA has determined that there are no significant ecological resources in

the area of the site, and no evident pathways by which Site contaminants could migrate and create ecological risk concerns.

Groundwater Contamination

As a result of the field work and sampling performed both as part of the RI for the Site and the adjacent Northrop and NWIRP sites, the nature and extent of chemical contamination was further defined at these properties. A general discussion of these findings is presented below. For a more complete examination of the analytical results of the RI/FS, see Tables 1 through 10. Figure 4 provides an outline of borehole, monitoring well and pumping well locations. Figure 5 summarizes VOC compounds detected in groundwater above ARARs. Figures 6 - 8 summarize TCE, PCE and VCM concentrations from the OU-3 remedial investigation.

The groundwater sampling and analyses conducted for the Northrop, NWIRP and Hooker/Ruco sites indicated that past activities at each of the sites have resulted in the contamination of groundwater resources within the Upper Glacial aquifer and Magothy aquifer. Sampling demonstrated that the groundwater beneath the Hooker/Ruco Facility, specifically underlying the southeastern portion of the Facility, and beneath the Northrop and NWIRP sites, contains chemical constituents above the NYS drinking water standards, NYS groundwater quality standards and EPA MCLs. The NYSDEC and EPA have determined that the primary groundwater contaminants of concern in the region of the three sites are VOCs (primarily TCE, PCE and VCM). The secondary contaminants are SVOCs, TICs, and inorganics which are associated with the three sites as noted below:

- 1) Hooker/Ruco: TICs (including glycols and acids) and metals;
- 2) Northrop: inorganics including arsenic, cadmium, and chromium, and;
- NWIRP: SVOCs including: bis[2-ethylhexyl]phthalate, di-n-butylphthalate, di-n-octylphthalate, 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, naphthalene, acenaphthylene, fluoranthene, benzo[b]fluoranthene, pyrene and TICs including polyaromatic hydrocarbons, substituted benzenes, alkanes, substituted phenols, and carboxylic acids; and inorganics including cadmium, chromium and thallium.

The most prevalent VOCs and their corresponding maximum concentrations detected in the groundwater in the vicinity of the sites were as follows: TCE at 58,000 parts per billion (ppb) at

NWIRP, 25,000 ppb at the Northrop facility; and 1100 ppb at the Hooker/Ruco Facility. The highest concentrations of PCE detected were 490 ppb at the Northrop site and 350 ppb at the Hooker/Ruco Facility. Similarly, the highest concentrations of VCM detected were 6,400 ppb at the Hooker/Ruco Facility in the area of monitoring well 52 (MW-52 area) and 550 ppb at Northrop. highest concentrations of total SVOCs and VOC TICs detected at the Hooker/Ruco Facility were 5100 ppb and 493 ppb, respectively. Individual TIC concentrations ranging from 2 ppb to 800 ppb were detected in two of the wells located at the downgradient boundary of the Hooker/Ruco Facility. In addition, antimony and arsenic were detected at the Hooker/Ruco Facility at concentrations as high as 22 ppb and 83 ppb, respectively. Based on computergenerated groundwater plume modeling developed as part of the Northrop RI Report (prepared by Geraghty and Miller (G&M) in 1994) and the report entitled "Regional Groundwater Feasibility Study," prepared by G&M in March 1998, VOC-impacted groundwater beneath and downgradient of each of the three sites is estimated to be approximately 12,100 feet long (along its north-south axis) 9,600 feet wide (along its east-west axis) and 580 feet deep (at its deepest point). The Northrop FS addresses this plume in Similarly, using G&M's computer-generated groundwater plume modeling, the area of the VCM subplume is estimated to be 2000 feet long (at its longest point), by 1350 feet wide (at its widest point), by 430 feet deep.

In general, the regional direction of the shallow horizontal groundwater flow is to the south/southeast away from the sites. Because of the direction of groundwater flow, the fact that a total of 14 production wells at these sites have historically pumped as high as 12 to 14 million gallons a day and that recharge occurs at the Northrop and NWIRP sites, much of the VOCimpacted groundwater from all three sites has been drawn onto and/or beneath the Northrop and NWIRP sites. However, because the degree of hydraulic containment obtained from the production wells was not 100 percent, some of the VOC-impacted groundwater has migrated downgradient. In addition, available data indicate that several public supply wells from the Bethpage Water District have been affected by VOCs which are likely attributed to all three sites. These supply wells, however, have been equipped with VOC treatment units provided by Northrop and NWIRP. water fed to these distribution systems continues to meet all New York State and Federal drinking water standards. Currently, there are no private drinking water supply wells in the residential areas surrounding the sites. A Nassau County ordinance, Public Health Ordinance Article IV, prohibits the installation of new private drinking water wells in areas served by public water. As discussed in the above Section on Geology and Hydrogeology, the public water supply is obtained from the sole source groundwater aquifer.

SUMMARY OF SITE RISKS

Based upon the results of the 1992 RI, EPA conducted a baseline risk assessment to estimate the potential risks associated with current and future exposure to Hooker/Ruco Site contaminants. Since this operable unit is focused on groundwater, the baseline assessment estimates the human health and ecological risk which could result from exposure to the contaminated groundwater at the Hooker/Ruco Site if no remedial actions were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action.

Human Health Risk Assessment

The Hooker/Ruco Facility is currently zoned industrial with residential neighborhoods in close proximity. Currently, there are no private drinking water wells on the Hooker/Ruco Facility or in the adjacent residential areas surrounding the Hooker/Ruco Site. EPA believes that, based on the historical uses of the Hooker/Ruco Facility, the most reasonably anticipated future land use of the Hooker/Ruco Facility is most likely to be commercial/industrial. However, a resident was assumed to live at the downgradient property line and use the sole source aquifer as a water supply. Therefore, the baseline risk assessment focused on potential future health effects for both adults and children, in a residential setting, that could result from potential exposure to groundwater via ingestion, inhalation, and dermal contact.

A four-step process is utilized for assessing Site-related human health risks for a reasonable maximum exposure scenario: Hazard Identification--identifies the contaminants of concern at the site based on several factors such as toxicity, frequency of occurrence, and concentration. Exposure Assessment--estimates - the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed. Toxicity Assessment--determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). Risk Characterization-summarizes and combines results of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks.

Hazard Identification

In this step, the contaminants of concern (COCs) at the Hooker/Ruco Site in groundwater were identified based on such

factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation. Several inorganic chemicals and organic compounds meeting appropriate QA/QC requirements were selected as COCs because of the potential hazard they pose to human health and the environment under current and future conditions. The COCs in the groundwater at the Hooker/Ruco Site include organic compounds and metals such as VCM, tetrachloroethene, PCE, TCE, bis(2-ethylhexyl) phthalate, arsenic, antimony, and beryllium. Of these chemicals, arsenic and VCM are classified as Class A carcinogens; known to cause cancer in humans.

Table 11 summarize the chemicals detected in the groundwater at the Hooker/Ruco Site. This table include the range of concentrations detected for each chemical (minimum and maximum), the mean concentration, and the 95% upper confidence limit on the mean concentration.

Exposure Assessment

In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Factors relating to the exposure assessment include, but are not limited to, the concentrations that people might be exposed to and the potential frequency and duration of exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

At the Hooker/Ruco Site, the complete exposure pathways evaluated were groundwater ingestion, inhalation, and dermal contact. The potentially exposed populations evaluated were future residential adults and children.

The exposure parameters representing such values as exposure frequency, exposure duration, body weight, groundwater ingestion rate, etc. are found in Tables 12 and 13. These values are used in the exposure equations to calculate chronic daily intakes.

Toxicity Assessment

In this step, the types of adverse health effects associated with chemical exposures, and the relationship between the magnitude of exposure (dose) and severity of adverse effects (response) are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health effects, such as changes in the normal functions of organs within the body (e.g., changes in the

effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health effects.

Oral and inhalation cancer slope factors and oral and inhalation reference doses were used to estimate the carcinogenic risks and noncarcinogenic hazards associated with Hooker/Ruco Site contaminants. The chronic toxicity information for the COCs based on information in EPA's Integrated Risk Information System (IRIS), the 1997 Health Effects Assessment Summary Tables, and from EPA's National Center for Environmental Assessment Superfund Technical Support Team is found in Table 14.

A number of chemicals lack adequate toxicity information to quantify the potential risks and hazards associated with exposure. A list of the chemicals not quantitatively evaluated are provided in the Hooker/Ruco Site documents. Lack of data to quantify risks and hazards for these chemicals may cause the risks and hazards at the Hooker/Ruco Site to be underestimated.

Risk Characterization

This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of Hooker/Ruco Site risks. Exposures are evaluated based on the potential risk of developing cancer and the potential for noncancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10⁻⁴ cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to Hooker/Ruco Site contaminants under the conditions explained in the Exposure Assessment. Current Superfund guidelines for acceptable exposures are an individual lifetime excess cancer risk to a reasonably maximally exposed individual in the range of 10-4 to 10⁻⁶ (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk). Action is generally warranted when excess lifetime cancer risk exceeds one-in-tenthousand (10^{-4}) .

For noncancer health effects, a hazard index (HI) equal to or less than 1.0 is considered an acceptable exposure. An HI represents the sum of the individual exposure levels compared to their corresponding reference doses. The Reference Dose (RfD) represents a level that an individual may be exposed to that is not expected to cause any deleterious effects. The ratio of exposure to toxicity is represented as a Hazard Quotient. Hazard Quotients less than 1 indicate that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The HI is the sum of multiple chemical exposures across multiple routes. The key

concept for a noncancer HI is that a "threshold level" (measured as an HI of less than 1) exists below which noncancer health effects are not expected to occur. An HI greater than 1.0 indicates a potential for noncarcinogenic health effects.

The results of the baseline risk assessment indicate that the current use of groundwater at the Hooker/Ruco Site is not a risk since no one uses the groundwater for domestic purposes. future residential groundwater use scenario showed unacceptable risks to human health. Future groundwater ingestion exposures yielded carcinogenic risks to adults of 2.2×10^{-3} and 8.8×10^{-4} for children. The groundwater inhalation exposure to adult residents in the future use scenario results in a potential carcinogenic risk of 5.0×10^{-4} . Tables C-1 and C-2 of the Risk Assessment and Table 2.1 of the FS Report show that the majority of the carcinogenic risk (65 to 99 percent) can be attributed to potential exposure to the VCM. Potential groundwater ingestion by adults and children also yielded HIs of 4.89 and 10.2, respectively. The cancer risk values and noncancer hazard indices for the residential adult and child can be found in Tables 15 and 16, respectively.

The groundwater risk calculations were prepared using the data set in the 1992 RI Report which showed a maximum VCM concentration of 560 ppb. More recent groundwater sampling data contained in the 2000 RI Report has shown higher VCM concentrations with a maximum value of 6,400 ppb. These more recent sampling results showing higher VCM concentrations would produce carcinogenic risks estimates from exposure to groundwater greater than the risks listed above and would also be considered unacceptable.

The results of the risk assessment indicate that the potential for carcinogenic risks and noncarcinogenic hazards exists for future adult and child residents through exposure to contaminated groundwater at the Hooker/Ruco Site especially from the VCM. Remedial action is warranted to address the unacceptable groundwater cancer risks greater than 10^{-4} and noncancer HIs greater than 1.0.

Ecological Risk Assessment

As discussed in above in the Section on Ecology, the Hooker/Ruco Facility is fully developed as an industrial facility and is surrounded by industries and residential properties. The media of concern for this operable unit is groundwater. Since there are no natural surface water bodies or wetlands within the Hooker/Ruco Site vicinity, there is no potential for the migration of contaminated groundwater to impact ecological resources. The only observed animal life at the Hooker/Ruco Site

were transient Canada geese, which would not come into contact with contaminated groundwater. The results of this evaluation indicate that the contaminated groundwater at the Hooker/Ruco Site does not pose an unacceptable ecological risk.

Discussion of Uncertainties in Risk Assessment

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis;
- environmental parameter measurement;
- fate and transport modeling;
- exposure parameter estimation; and
- toxicological data.

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the Risk Assessment provides upper-bound estimates of the risks to populations near the Hooker/Ruco Site, and is highly unlikely to underestimate actual risks related to the Site.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the Risk Assessment Report.

Actual or threatened releases of hazardous substances from the Hooker/Ruco Site, if not addressed by the selected alternative or

one of the other remedial measures considered, may present an imminent and substantial endangerment to the public health, welfare, and the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), site-specific risk-based levels and the most reasonably anticipated future land use for the Hooker/Ruco Site (that is, industrial/commercial use).

The Risk Assessment has identified a number of contaminants of concern (COCs) in the groundwater. As stated previously, the COCs in the groundwater of the Hooker/Ruco Site include organic compounds and metals such as vinyl chloride, tetrachloroethene, PCE, TCE, bis(2-ethylhexyl) phthalate, arsenic, antimony, and beryllium. The contaminants in the groundwater pose a future carcinogenic and noncarcinogenic health risk to residents who may reside at the downgradient (southern) Hooker/Ruco Facility boundary. These contaminants in groundwater are subject to a number of regulations for cleanup and discharge. These regulations include the New York State Water Quality Regulations, specifically, 6 NYCRR and 10 NYCRR as well as Federal MCLs. A complete list of the groundwater ARARs is included in Table 17. The treatment of groundwater will also address compounds which are not COCs, but exceed the ARARs.

The following remedial action objectives were established for the Hooker/Ruco Site:

- 1) Protect human health from exposure (via ingestion, inhalation, and dermal contact) to VCM, TCE, PCE and TICs in groundwater at concentrations in excess of New York State groundwater standards and Federal MCLs.
- 2) Restore the aquifer to meet New York State Groundwater Standards and New York State and Federal MCLs in a timely manner.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected remedy be protective of human health and the environment, be cost-effective, comply with other laws and regulation, and utilize permanent solutions, alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for

the reduction of toxicity, mobility, or volume of the hazardous substances.

The active remedial alternatives for the contaminated groundwater originating from the Hooker/Ruco Site were designed to primarily address the VCM subplume. VOC's other than VCM would be addressed by the Northrop Treatment System. EPA recognizes that this system as it is currently designed, would be unable to treat the VCM subplume without the system exceeding its air discharge limitations. This treatment system is expected to require more than 30 years of operation to restore the aquifer to meet drinking water standards.

The remedial alternatives developed to address the VCM subplume at the Hooker/Ruco Site are presented in detail below.

The construction time for each alternative reflects only the time required to construct or implement the remedy and not the time required to design the remedy, negotiate its performance by the parties responsible for the contamination, or procure contracts for design and construction.

SUMMARY OF GROUNDWATER REMEDIAL ALTERNATIVES

ALTERNATIVE 1: NO FURTHER ACTION

Capital Cost:	\$0
Annual Monitoring Cost:	\$60.00
Construction Time:	N/A
30-Year Present Worth Monitoring	•
Cost (7% discount factor):	\$74,000

The Superfund program requires that the "No-Action" Alternative be considered as a baseline level to which other remedial technologies and alternatives can be compared.

The No Further Action Alternative does not include any remedial measures to address the groundwater contamination at the Hooker/Ruco Site. It is recognized, however, that the regional VOC plume is being addressed by the Northrop Treatment System, which has been demonstrated to contain and prevent further migration of the portion of the plume that remains upgradient of the extraction system.

Because this alternative would result in elevated concentrations of VCM contamination remaining at the Hooker/Ruco Site above health-based levels, CERCLA requires that the remedy be reviewed every five years to evaluate groundwater conditions.

This alternative would include a long-term groundwater monitoring program. Under this monitoring program, groundwater samples would be collected and analyzed semi-annually.

The No Further Action Alternative would also include the development and implementation of a public awareness and education program for the residents in the area surrounding the Hooker/Ruco Site. This program would include the preparation and distribution of informational press releases and circulars and convening public meetings. These activities would serve to enhance the public's knowledge of the conditions at the Hooker/Ruco Site.

ALTERNATIVE 2: VCM SUBPLUME EXTRACTION, TREATMENT AND DISCHARGE TO ACHIEVE GROUNDWATER ARARS

Capital Cost: \$ 4,195,000
Annual O&M Cost: \$ 722,000
Construction Time: 12-18 Months

Present worth cost (operating

period of 30 years at a discount factor of 7%):

\$13,200,000

Alternative 2 involves extraction and treatment of groundwater within the area of the VCM subplume with a goal of restoring the water quality of the aquifer to State drinking water standards or Federal MCLs. The State drinking water standard and EPA's MCL for VCM is 2 ppb. The treatment system would be built in the immediate vicinity of the Hooker/Ruco Facility. Conceptually, one extraction well would be placed approximately 500 feet downgradient of the MW-52 area (where current VCM concentrations exceed 1000 ppb) with two additional wells located 1000 feet downgradient of the MW-52 area (where current VCM concentrations range between 10 and 100 ppb). The exact locations of the extraction wells would be determined during remedial design. three extraction wells were estimated to pump at a combined flow rate of 1000 gallons per minute. The effluent from the treatment system would be discharged to recharge basins on the Hooker/Ruco Site. Based on the hydrogeologic modelling presented in Appendix A of the FS, it is projected that the VCM concentrations in the VCM subplume would be reduced to levels below the MCL of 2 ppb in approximately 30 years. By containing and treating the VCM within the VCM subplume, supplemental VCM treatment would not be required at the downgradient treatment system which Northrop is operating as an interim remedial measure.

Alternative 2 relies on the continued operation of the groundwater extraction and treatment system at the Northrop Facility which is preventing further migration of the regional

VOC plume beyond the Northrop Treatment System. This system is expected to operate for the next 30 years.

A long-term monitoring program will be developed to monitor groundwater quality in the area of the VCM subplume and to evaluate the fate and migration of VOCs southward and westward beyond the VCM subplume. New monitoring wells would be added to the existing network of monitoring wells to increase the network's area of coverage. The objective of the long-term monitoring program is to evaluate the effectiveness of the selected remedy.

If the long-term monitoring program identifies the migration of the VCM subplume farther southward of the Hooker/Ruco Facility beyond the VCM source control wells at concentrations which may require supplemental VCM treatment at the Northrop Treatment System, additional extraction and treatment wells at the Hooker/Ruco Site may be required.

ALTERNATIVE 3: IN SITU TREATMENT OF VCM SUBPLUME BY BIOREMEDIATION USING BIOSPARGING (PLUS SUPPLEMENTAL NUTRIENT ADDITION, IF NECESSARY)

Capital cost: \$1,260,000

O&M costs (per year): \$319,000

Construction Time: 6-8 Months

Present worth cost for 10 years of

biosparging and 2 years of nutrient

addition (using a discount factor of 7%): \$3,800,000

This alternative utilizes in-situ biosparging technology to treat the VCM subplume. Biosparging is a form of bioremediation and involves the introduction of air/oxygen into the aquifer to increase the dissolved oxygen content in the aquifer, which would enhance aerobic degradation of VCM. This alternative is designed to remove and reduce the concentration of VCM to a level that achieves State drinking water standards or Federal MCLs and whereby supplemental treatment for VCM at the Northrop Treatment System is not required. Aerobic conditions in the aquifer would result in an increased microbial population which would also enhance the degradation of TICs. Aerobic conditions will not enhance the degradation of PCE, and will enhance the degradation of TCE only when sufficient quantities of a suitable carbon source such as methane is present; therefore, the effect of biosparging on TCE and PCE would be limited.

If necessary, this alternative would also utilize a supplemental bioremediation technology following the biosparging treatment. Supplemental bioremediation would involve the injection of nutrients (possibly nitrogen and phosphorus, along with suitable

carbon sources such as methane) to enhance the growth and metabolic activities of indigenous microbial populations to effect the degradation of VCM in the aquifer. The addition of nutrients to stimulate the microbial population would also enhance the degradation of TCE, PCE and TICs. It is estimated that the nutrient addition would occur over a two-year period. The exact nutrient requirement is dependent on the presence of other constituents in groundwater and would be determined through treatability studies.

Conceptually, twelve injection wells would be installed in the area of the VCM subplume to a depth of 200 to 400 feet using common drilling techniques. Additives (air/oxygen, nutrients) would be forced into the formation using either static head within the well or using pump-supplied pressure. Increasing or decreasing the number of air/oxygen and nutrient injection locations and the rate of injection, would also affect the duration. Periodic or pulsed injections (monthly, bimonthly, quarterly) are suitable for biosparging. The exact locations of the injection wells and the treatment scenario would be determined after conducting appropriate pilot studies during remedial design. The primary goal of in-situ biosparging is to reduce the concentration of VCM to the MCL of 2 ppb. Because it is considered an innovative technology, performance criteria would be developed during remedial design to measure the effectiveness of this technology at the Hooker/Ruco Site.

Similar to Alternative 2, to ensure that the regional groundwater VOC plume is adequately addressed, Alternative 3 also relies on the ongoing and anticipated long-term operation of the Northrop Treatment System.

Alternative 3 also would include the same long-term monitoring program described for Alternative 2. Similarly, Alternative 3 also acknowledges the possible need to expand the biosparging system to ensure that the Northrop treatment system will meet its air discharge limitations for vinyl chloride.

COMPARATIVE ANALYSIS OF GROUNDWATER ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria. These nine criteria are as follows: overall protection of human health and the environment; compliance with applicable or relevant and appropriate requirements; long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; short-term effectiveness; implementability; cost; and State and community acceptance. The evaluation criteria are described below.

Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

Compliance with applicable or relevant and appropriate requirements (ARARS) addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes and requirements, or provide grounds for invoking a waiver. Other federal or state advisories, criteria or guidance are To-be-Considered (TBCs). TBCs are not required by the NCP, but may be very useful in determining what is protective for a site or how to carry out certain actions or requirements.

Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. This criteria also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.

Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

<u>Implementability</u> is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

Cost includes estimated capital and operation and maintenance
(O&M) costs, and net present worth costs.

State acceptance indicates whether, based on its review of the RI/FS and Proposed Plan, the State concurs with, opposes, or has no comment on the preferred remedy.

<u>Community acceptance</u> is assessed in the ROD and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports.

Overall Protection of Human Health and the Environment

Alternative 1, No Further Action, would be the least effective of the alternatives in protecting human health and the environment because no active remedial measures are included under this alternative. Furthermore, Alternative 1 would allow the VCM subplume to migrate to the Northrop Treatment System which would cause this system to release unacceptable levels of vinyl chloride to the environment. Alternatives 2 and 3 would be protective of human health and the environment as these would remove a sufficient mass of contamination from the VCM subplume to achieve MCLs and so that supplemental treatment for VCM at the Northrop Treatment System would not be required. Alternative 2 would be more protective than Alternative 3 because Alternative 2 would remove all VOCs to levels that would restore the aquifer to drinking-water quality in the area of the VCM subplume.

Compliance with ARARs

Alternatives 2 and 3, but not Alternative 1, would comply with chemical-specific ARARs, which consist primarily of Federal and State MCLs for the sole source aquifer under Long Island. In time, Alternative 1 would result in the downgradient Northrop Treatment System exceeding its permit limitations for vinyl chloride.

The discharge of treated groundwater to recharge basins under Alternative 2 would also meet groundwater discharge standards. Both Alternatives 2 and 3 would also reduce the concentration of the VCM subplume to the level that supplemental treatment for VCM at the Northrop Treatment System would not be required. For a complete listing of groundwater ARARs see Table 17.

Long-Term Effectiveness and Permanence

Alternative 1 would not be effective in protecting human health and the environment. In fact, Alternative 1 would result in the downgradient Northrop Treatment System exceeding its permit limitation for vinyl chloride. Both Alternatives 2 and 3 would be effective over the long-term in protecting public health and the environment. Both alternatives require long-term operation and both rely on the continued operation of the Northrop Treatment System. However, they are permanent remedies for the restoration of the aquifer to its productiveness as a source of drinking water.

Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative 1 would provide no additional reduction of toxicity, mobility or volume of the contaminants at the Hooker/Ruco Site

except as provided by the Northrop Treatment System. Alternative 2 would be most effective in reducing the toxicity, mobility and volume of all VOC contaminants, as this alternative would involve an established technology which is more certain to restore the aquifer to drinking water quality in the area of the VCM subplume. Alternative 3, which is an innovative technology, would also reduce the toxicity and volume of VCM, other VOCs and TICs, but perhaps to a lesser extent, through the introduction of air/oxygen, and possibly substrates and nutrients to promote insitu bioremediation. Alternative 3 would also reduce the VCM subplume to a level that supplemental treatment at the Northrop Treatment System would not be required in order to comply with the air discharge limitation for vinyl chloride. Further, under Alternative 3, any residual contamination that might not be treated by biosparging or bioremediation would be captured and treated by the Northrop Treatment System.

Short-Term Effectiveness

Alterative 1 would not involve any remediation and therefore would not pose any short-term impacts to the Hooker/Ruco Site workers or the community. Over the long-term, however, Hooker/Ruco Site workers and the community would be at potential risk under Alternative 1 because of exposure to VCM at levels that are likely to exceed the air discharge limitations at the Northrop Treatment System. Although Alternative 2 would have potential short-term impacts to the Hooker/Ruco Site workers during the construction of the groundwater extraction and treatment system, these impacts would be minimized by following appropriate health and safety measures. Risks to operators of the treatment system would be minimized by following appropriate operation and maintenance procedures and adhering to personal safety measures. Under Alternative 2, catalytic oxidation would be used to treat the off-gas air stream from the treatment of the VCM in order to protect the on-Site workers and the community. Because there would be fewer construction activities, Alternative 3 would pose less short-term risk to Hooker/Ruco Site workers than Alternative 2. Risks during installation of the air/oxygen delivery systems would be minimized by following appropriate health and safety measures. Risks to operators of the system would be similarly minimized.

A benefit of Alternative 3 when compared to Alternative 2 is that groundwater is not extracted or discharged from/to the aquifer. This would result in less stress to the environment and less chance of exposure to contaminants. Additionally the construction of the treatment system, recharge basins and force mains would not be required.

<u>Implementability</u>

Alternative 1 would be the easiest alternative to implement as it does not include any remedial measures. Alternative 2 would be readily implementable as it is a widely used and proven treatment technology. However, Alternative 2 would take longer to implement than Alternatives 1 and 3, because it would require the construction of a groundwater extraction and treatment system. Alternative 3 would involve installation of a delivery system for providing air/oxygen (and also nutrients, if necessary) for the in-situ treatment of the VCM and would be easier to implement than Alternative 2 because it would have fewer construction activities.

Cost

The present-worth cost of the alternatives are calculated using a discount factor of seven percent and a 30-year time interval for Alternative 2 and 12-year interval for Alternative 3. The estimated capital, operation, maintenance and monitoring (O&M) and present-worth costs for each of the alternatives are presented below:

Alt.	Capital Cost	Annual O&M Cost	Present-Worth Cost
Alt-1	\$0	\$6000	\$74,000
Alt-2	\$4,195,000	\$722,000	\$13,200,000
Alt-3	\$1,260,000	\$319,000	\$3,800,000

^{*} Alternative 1 includes monitoring cost only.

As can be seen by the cost estimates, Alternative 1 would be the least costly alternative to implement. Alternative 2 would be the most costly alternative to implement. The high cost of implementing this alternative is due to the construction and long-term O&M and monitoring of a groundwater extraction and treatment system.

State Acceptance

NYSDEC concurs with the selected remedy. A letter of concurrence is attached (Appendix IV).

Community Acceptance

Community acceptance of the proposed remedy for groundwater was were assessed during the public comment period. EPA believes that the community generally supports this approach. Specific responses to public comments are addressed in the Responsiveness Summary (Appendix V).

PRINCIPAL THREAT WASTES

Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. Contaminated groundwater generally is not considered to be source material; accordingly, there are no source materials defined as principal threat wastes at the Hooker/Ruco Site.

SELECTED REMEDY

Based upon the results of the RI/FS and other investigative reports and after careful evaluation of the various alternatives and considering community acceptance of the proposed remedy, EPA has selected Alternative 3 - In-Situ Treatment of the VCM Subplume by Bioremediation using Biosparging (Plus Supplemental Nutrient Addition, if necessary) as the selected remedy for the Hooker/Ruco Site groundwater remediation.

If it is determined during the implementation and long-term monitoring of the selected remedy that the technology selected is not effective in adequately reducing the VCM concentrations in a reasonable time frame, then VCM subplume extraction and treatment will be implemented as a contingency remedy.

Summary of the Rationale for the Selected Remedy

The selected remedy will provide the best balance of trade-offs among the alternatives with respect to the evaluating criteria as described below.

Alternative 3 is being selected because it is a cost-effective and reliable measure to significantly decrease the VCM concentrations within the center of the subplume in a relatively short time frame, compared to the other treatment alternative.

The remedy will permanently mitigate the threat posed by VCM, and will result in less disruption of the Hooker/Ruco Facility than Alternative 2. Alternative 3 will remove and reduce the concentration of VCM to a level that achieves State drinking water standards or Federal MCLs and whereby supplemental

treatment for VCM at the Northrop Treatment Facility will not be required.

A benefit of Alternative 3 when compared to Alternative 2 is that groundwater is not extracted from or discharged to the aquifer. Additionally, the construction of a treatment system, recharge basins and force mains will not be required. Therefore, Alternative 3 will result in less stress to the environment than Alternative 2.

Alternative 3 relies on the continued operation of the Northrop Treatment System to address the commingled VOC groundwater plume. This system, which is expected to operate for the next thirty years, will also prevent the plume's further migration.

The Selected Remedy will be protective of human health and the environment, will comply with ARARs, will be cost-effective, and will utilize permanent solutions and treatment technologies to the maximum extent practicable.

Description of Selected Remedy

The selected remedy is Alternative 3: In-Situ Treatment of VCM Subplume by Bioremediation Using Biosparging (Plus Supplemental Nutrient Addition, If Necessary). The components of Alternative 3 include the use of biosparging technology in an in-situ application to enhance the VCM degradation. Biosparging is a form of bioremediation and involves the introduction of air/oxygen into the aquifer to increase the dissolved oxygen content in the aquifer, which would enhance aerobic degradation of VCM. The goal of the selected remedy is to remove and reduce the concentration of VCM to achieve the State drinking water standard and Federal MCL of 2 ppb whereby supplemental treatment for VCM at the Northrop Treatment System is not required. Aerobic conditions in the aguifer will result in an increased microbial population which will also enhance the degradation of Aerobic conditions will not enhance the degradation of PCE, and will enhance the degradation of TCE only when sufficient quantities of a suitable carbon source such as methane is present; therefore, the effect of biosparging on TCE and PCE would be limited.

If necessary, the selected remedy will also utilize a supplemental bioremediation technology following the biosparging treatment. Supplemental bioremediation will involve the injection of nutrients (potentially including nitrogen and phosphorus along with suitable carbon sources such as methane) to enhance the growth and metabolic activities of indigenous microbial populations to effect the degradation of VCM in the aquifer. The addition of nutrients to stimulate the microbial

population will also enhance the degradation of TCE, PCE and TICs. It is estimated that the nutrient addition will occur over a two-year period to effectively enhance the degradation of the VOCs. The exact nutrient requirement is dependent on the presence of other constituents in groundwater, and will be determined through treatability studies.

Conceptually, twelve injection wells will be installed in the area of the VCM subplume to a depth of 200 to 400 feet using common drilling techniques. Additives (air/oxygen, nutrients) could be forced into the formation using either static head within the well or using pump-supplied pressure. Increasing or decreasing the number of air/oxygen and nutrient injection locations, and the rate of injection, would also affect the Periodic injections (monthly, bimonthly, quarterly) duration. are suitable for biosparging. The exact locations of the injection wells and the treatment scenario will be determined after conducting appropriate pilot studies during remedial design. Although in-situ biosparging has been used effectively at other sites, because it is considered an innovative technology, the performance criteria used to measure the effectiveness of this technology at the Hooker/Ruco Site will also need to be developed during the remedial design phase. vadose zone or unsaturated zone monitoring program will be implemented to eliminated/minimized the air stripping of VOCs, particularly VCM, as a result of biosparging.

As stated previously, the selected remedy addresses the downgradient commingled contaminated groundwater plume beyond the Hooker/Ruco Facility and the contaminated groundwater beneath the Hooker/Ruco Facility which was previously included as part of the remedy in the OU-1 ROD.

A long-term monitoring program will be developed to monitor groundwater quality in the area of the VCM subplume and to evaluate the fate and migration of VOCs southward and westward beyond the VCM subplume. New monitoring wells will be added to the existing network of monitoring wells to increase the network's area of coverage. The objective of the long-term monitoring program is to evaluate the effectiveness of the selected remedy. If it is determined during the implementation and long-term monitoring of the selected remedy that the technology selected is not effective in adequately reducing the VCM concentrations in a reasonable time frame, then VCM Subplume Extraction and Treatment (Alternative 2) will be implemented as a contingency remedy.

In order to ensure that the regional groundwater plume is adequately addressed, the selected remedy also relies on the ongoing and anticipated long-term operation of the Northrop

Treatment System. If this system ceases operation before the aquifer is restored, or if the Northrop system is not capturing the contamination emanating from the Hooker/Ruco Facility, EPA will re-evaluate the protectiveness of the selected remedy.

The components of the contingency remedy include extraction and treatment of groundwater within the area of the VCM subplume with a goal of restoring the water quality of the aquifer to State drinking water standards or Federal MCLs. The State drinking water standard and EPA's MCL for VCM is 2 ppb. The treatment system would be built at the southwest corner of the Hooker/Ruco Site. Conceptually, one extraction well would be placed approximately 500 feet downgradient of the MW-52 area (where current VCM concentrations exceed 1000 ppb) with two additional wells located 1000 feet downgradient of the MW-52 area (where current VCM concentrations range between 10 and 100 ppb). exact locations of the extraction wells will be determined during remedial design. The three extraction wells will pump at a combined flow rate of 1000 gallons per minute. The treated effluent from the treatment system would be discharged to recharge basins on the Hooker/Ruco Site. Based on the hydrogeologic modelling presented in Appendix A of the FS, it is projected that the VCM concentrations in the VCM subplume would be reduced to levels below the MCL of 2 ppb in approximately 30 years. By containing and treating the VCM subplume, potential need for supplemental VCM treatment at the downgradient Northrop Treatment System would not be a concern.

Summary of the Estimated Remedy Costs

The estimated present worth cost to implement the selected remedy is \$3,800,000. The capital cost for the remedy is estimated to be \$1.2 million and the estimated average annual O&M costs are approximately \$319,000 (biosparging). The present worth costs are calculated using a discount factor of seven percent and a 12-year interval.

The estimated present worth cost to implement the contingency remedy (pump and treat) is \$13,200,000. The capital cost for the remedy is estimated to be \$4,195,000 and the estimated average annual O&M cost are approximately \$722,000 (pump and treat). The present worth costs are calculated using a discount factor of seven percent and a 30-year operating period.

The information in this cost estimate summary is based on the best available information regarding the anticipated scope of the remedial alternatives. These are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 percent of the actual cost of the project. Changes in the cost elements are likely to occur as a result of new information and data

collected during the engineering design of the components of this remedial alternative. Major changes may be documented in the form of a memorandum in the administrative record file, an Explanation of Significant Differences (ESD), or a ROD amendment.

Expected Outcomes of Selected Remedy

The selected remedy will adequately reduce the toxicity and volume of VCM, and to a lesser extent, other VOCs and TICs to a cleanup level achieves State drinking water standards or Federal MCLs and that would not require supplemental treatment at the downgradient Northrop Treatment System. Further, under the selected remedy, any residual contamination that might not be treated by biosparging or bioremediation would be captured and treated by the Northrop Treatment System. The selected remedy, together with the Northrop Treatment System is expected to effectively capture and treat the contamination emanating from the Hooker/Ruco Facility and to restore the aquifer to its beneficial use.

The selected remedy poses very few short-term risks to site workers when compared to Alternative 2 (under which catalytic oxidation would be used to treat the off-gas air stream from the treatment of the VCM) because there will be very few construction activities under this remedy. Further, the selected remedy will be easier to implement than Alternative 2 for the same reason.

Design of the selected remedy system is expected to take approximately one year and construction is expected to take six to eight months.

STATUTORY DETERMINATIONS

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when complete, the selected remedial action for the Hooker/Ruco Site must comply with applicable, or relevant and appropriate environmental standards established under Federal and State environmental laws unless a waiver from such standards is justified. The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resourcerecovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances. following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy is protective of human health and the environment. The selected remedy is designed to reduce the concentration of VCM to a level that achieves State drinking water standards or Federal MCLs and whereby supplemental treatment for VCM at the Northrop Treatment System is not required. To ensure that the regional VOC groundwater plume is adequately addressed, the selected remedy recognizes and relies on the ongoing and anticipated long-term operation of the Northrop Treatment System. The selected remedy also recognizes that the Northrop system is expected to continue to prevent further migration of the plume it contains and that the system is expected to operate for the next thirty years. As the Northrop and NWIRP sites are New York State-lead sites, EPA and NYSDEC agreed to undertake a coordinated effort to address the commingled plume. This approach acknowledges that there are both administrative and practical considerations behind the division of responsibility for components of the remedial work so as to avoid duplication of efforts and the resulting expense to all parties involved. As such, EPA and the State's remedies will each target different facilities and different contaminants, though some overlap may be inevitable; when conducted together, these components will eventually result in the groundwater meeting the drinking water standards.

Available data indicate that several public supply wells from the Bethpage Water District have been affected by VOCs attributable to the commingled plume emanating from the three sites. These supply wells, however, have been equipped with VOC treatment units provided by Northrop and the U.S. Navy. The water fed to these distribution systems continues to meet all New York State and Federal drinking water standards. Currently, there are no private drinking water supply wells in the residential areas surrounding the three sites. A Nassau County ordinance, Public Health Ordinance Article IV, prohibits the installation of new private drinking water wells in areas served by public water.

Compliance with ARARS

The NCP (\$\$300.430(f)(5)(ii)(B) and (C)) requires that the selected remedy attain Federal and State ARARs. The selected remedy and/or the contingency remedy will comply with the following action—, contaminant— and action—specific ARARs identified for the Hooker/Ruco Site and will be demonstrated through monitoring, as appropriate.

Action-Specific ARARs:

Air Quality:

- Clean Air Act, 42 U.S.C. §§ 7401 et seq.
- National Emissions Standards for Hazardous Air Pollutants,
 40 CFR Part 61.
- Air Pollution Control Act (New York State Environmental Conservation Law ("ECL") 19-0101 et seg.)
- Air Pollution Control Regulations, 6 NYCRR Parts 200 to 257.

Water Quality:

- Water Pollution Control (New York State Environmental Conservation Law ("ECL") 17-0101 et seq.)
- Reclassification of Waters (Water Classifications and Quality Standards), 6 NYCRR Parts 609, 700-704.
- Small System Compliance Technology List for the Surface Water Treatment Rule (EPA 815-R-97-002).
- Small System Compliance Technology List for the Surface Water Treatment Rule and Total Coliform Rule (EPA 815-R-98-001).
- Small System Compliance Technology List for the Non-Microbial Contaminants Regulated Before 1996 (EPA 815-R-98-002).
- Variance Technology Findings for Contaminants Regulated Before 1996 (EPA 815-R-98-003).

Hazardous Waste:

- Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §§ 6901 et seg.
- Standards for Handling, Transportation and Disposal of Hazardous Waste, including Land Disposal Restrictions, 40 CFR 260-268.
- Collection, Treatment and Disposal of Refuse and other Solid Waste (Solid and Hazardous Waste Management Laws), ECL 27-0101 et seq.
- Waste Transporter Permit Regulations, 6 NYCRR Part 364.
- Standards for Handling, Transportation and Disposal of Hazardous Waste DOT transportation regulations, 6 NYCRR Parts 370-376.
- Hazardous Waste Program Fees, 6 NYCRR Parts 483 Hazardous Waste Program fees) and 484 (Waste Transporter Fees).

Chemical-Specific ARARs:

- Clean Water Act, 33 U.S.C. §§ 1251-1387.
- Safe Drinking Water Act, 42 U.S.C. §§ 300f et seq.

- Safe Drinking Water Act Maximum Contaminant Levels (MCLs),
 40 CFR Part 141.
- Surface water and Groundwater Quality Standards and Groundwater Effluent Standards, 6 NYCRR Part 703.
- Drinking Water Supplies (New York Public Water Supply Regulations), 10 NYCRR Part 5.
- Ambient Air Quality Standards, 6 NYCRR Parts 256 and 257.
- Water Classifications and Quality Standards, 6 NYCRR Parts 609, 700-704.

To-Be-Considered:

- New York State Air Guide I (1991) NYSDEC Control of Toxic Ambient Air Contaminants
- New York State Technical Manual "Contained-In" Criteria for Environmental Media
- Reference Doses (RFD), EPA Office of Research and Development
- Carcinogenic Potency Factors, EPA environmental Criteria and Assessment Office; EPA Carcinogen Assessment Group
- Health Advisories, EPA Office of Drinking Water
- Air/Superfund National Technical Guidance Study Services
- Groundwater Protection Strategy (EPA, 1984)
- Control of Air Emissions from Superfund Air Strippers at Superfund Groundwater Sites (OSWER Directive 9355.0-28)

Cost Effectiveness

A cost-effective remedy is one whose costs are proportional to its overall effectiveness (NCP §300.430(f)(l)(ii)(D)). Overall effectiveness is based on the evaluations of: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Based on the comparison of overall effectiveness discussed above to cost, the selected remedy meets the statutory requirement that Superfund remedies be cost-effective in that it is the least cost action alternative and would achieve the remediation goals in less time. The contingent remedy, while more expensive, would also nevertheless be cost-effective as it would only be implemented if the selected remedy is ineffective in achieving the remediation goals.

Each of the alternatives has undergone a detailed cost analysis. In that analysis, capital costs and O&M costs have been estimated and used to develop present-worth costs. In the present-worth cost analysis, annual costs were calculated for the estimated life of an alternative using a seven percent discount rate (consistent with the FS and Proposed Plan). For a detailed breakdown of costs associated with the selected remedy and contingency remedy, please see Tables 18 and 19.

<u>Utilization of Permanent Solutions and Alternative Treatment</u> Technologies to the Maximum Extent Practicable

EPA has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at this Site. The selected remedy (biosparging and enhanced bioremediation) utilizes permanent solutions to address the groundwater contamination by reducing the toxicity and volume of the VCM subplume at the Hooker/Ruco Site to levels that achieve State standards and Federal MCLs. The selected remedy represents the most appropriate solution for the Hooker/Ruco Site because it provides the best balance of trade-offs among the alternatives with respect<to the evaluation criteria. The contingency remedy also provides for the same level of permanence and treatment.

Preference for Treatment as a Principal Element

The statutory preference for remedies that employ treatment as a principal element is satisfied through the use of the innovative treatment measures (biosparging) to adequately reduce the toxicity and volume of contamination in the aquifer emanating from the Hooker/Ruco Facility.

Five-Year Review Requirements

Because this remedy will result in hazardous substances remaining at the Hooker/Ruco Site above levels that allow for unlimited use of and unrestricted exposure to the Hooker/Ruco Site, a review will be conducted no less often than once every five years after commencement of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant changes from the preferred remedy presented in the Proposed Plan.

RECORD OF DECISION

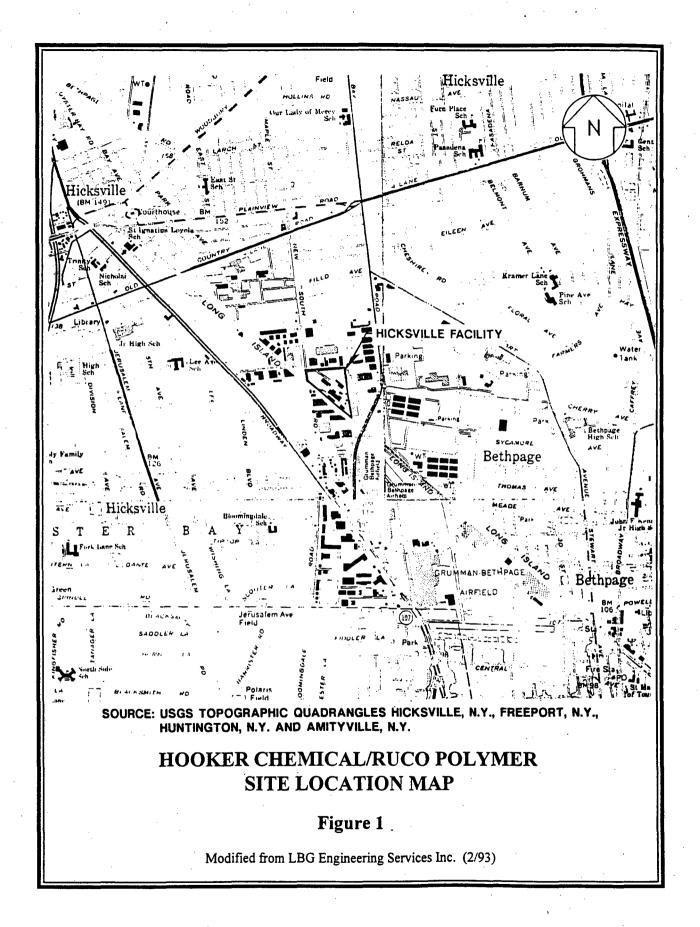
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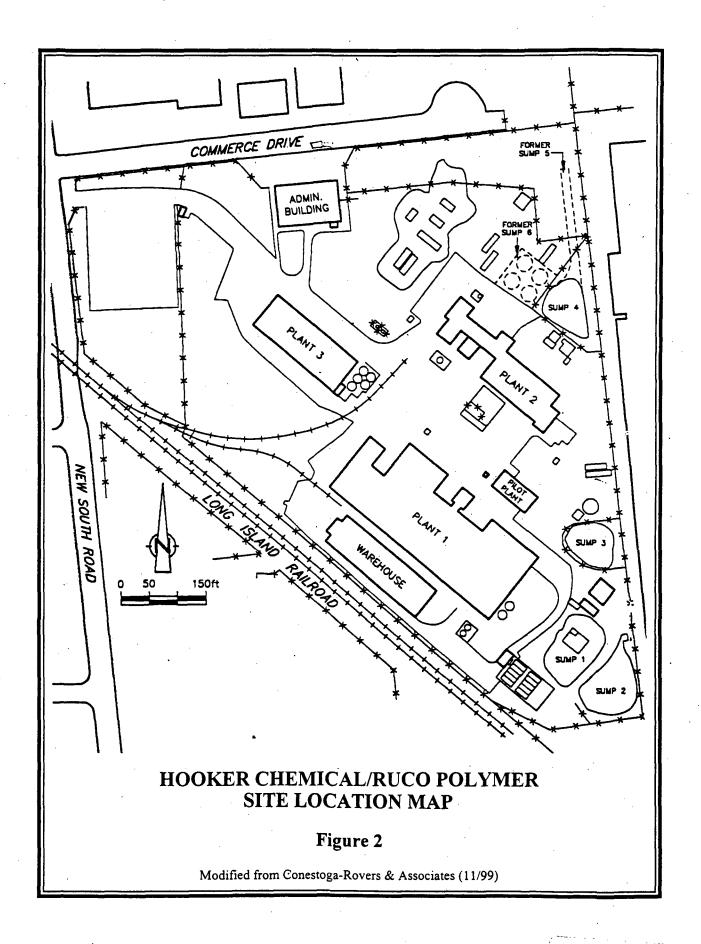
APPENDICES

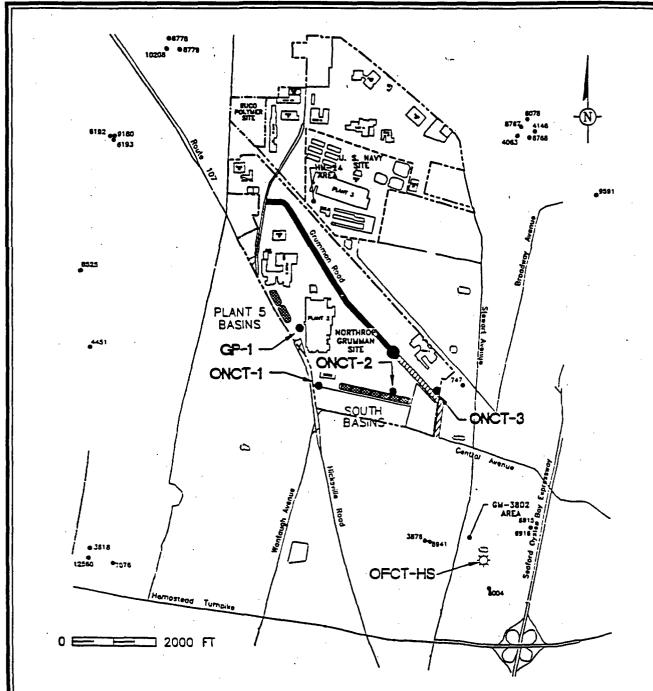
APPENDIX I

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- Figure 3 Northrop Grumman Aerospace Corporation, Hooker Chemical/Ruco Polymer and Naval Weapons Industrial Reserve Plant Sites
- Figure 4 Borehole, Monitoring Well, and Pumping Well Locations
- Figure 5 VOC Compounds Detected in Groundwater Above ARARs
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 Figure 7 Groundwater Tetrachloroethylene concentrations
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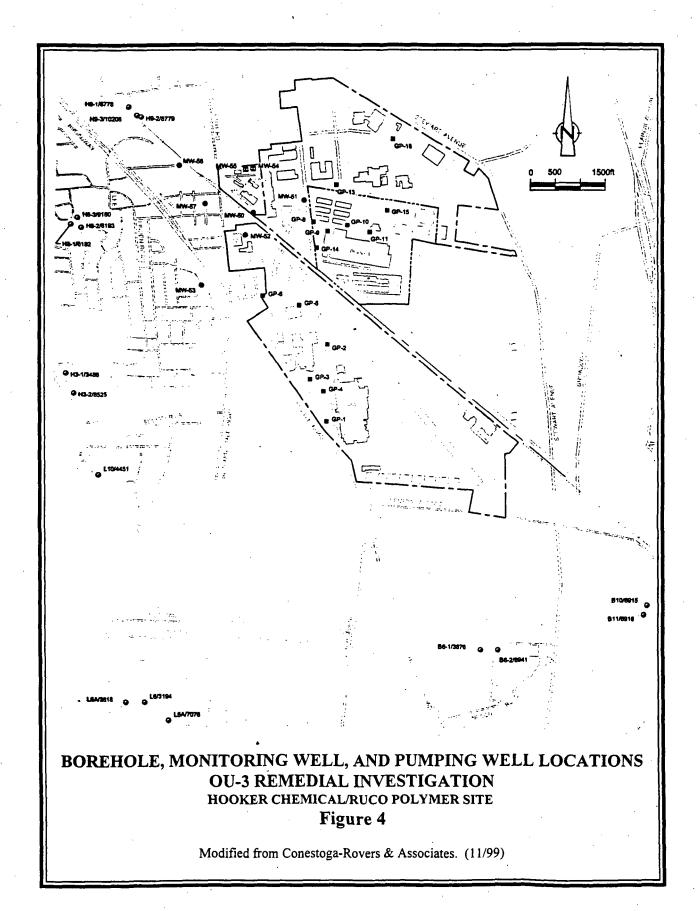


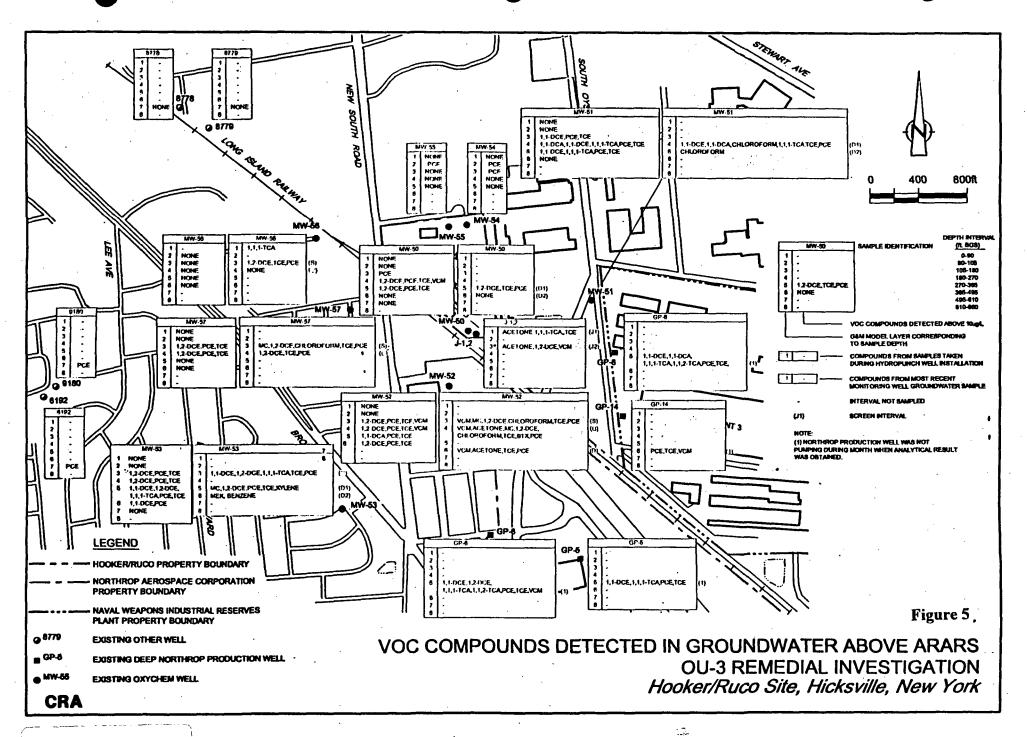


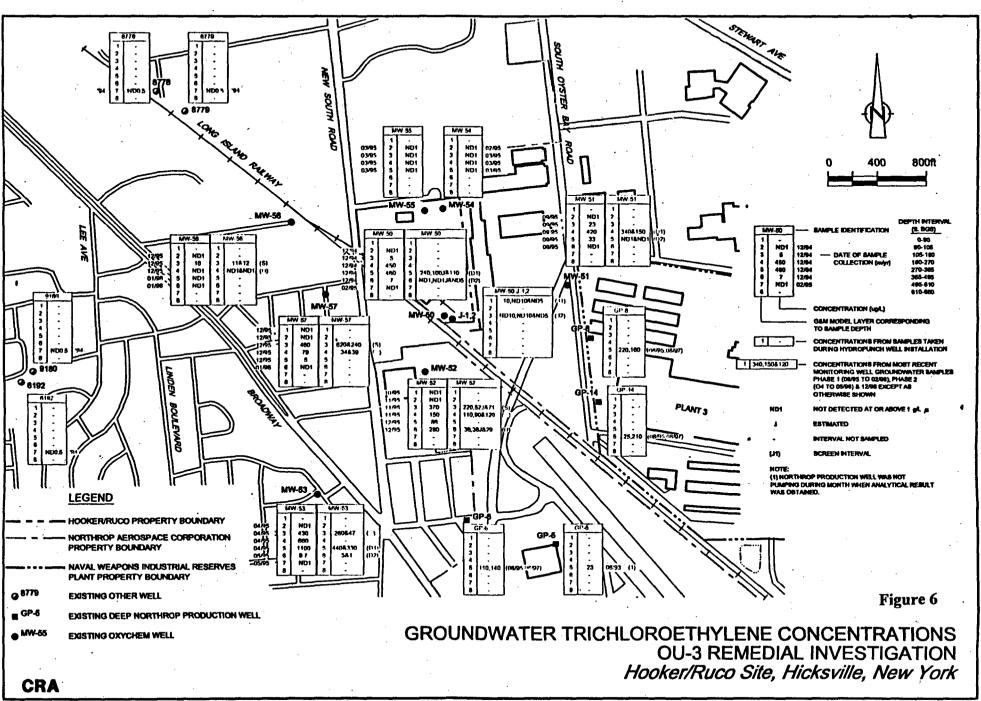
NORTHRUP/GRUMMAN AEROSPACE CORPORATION, HOOKER CHEMICAL/RUCO POLYMER SITE AND AND NAVAL WEAPONS INDUSTRIAL RESERVE PLANT SITES

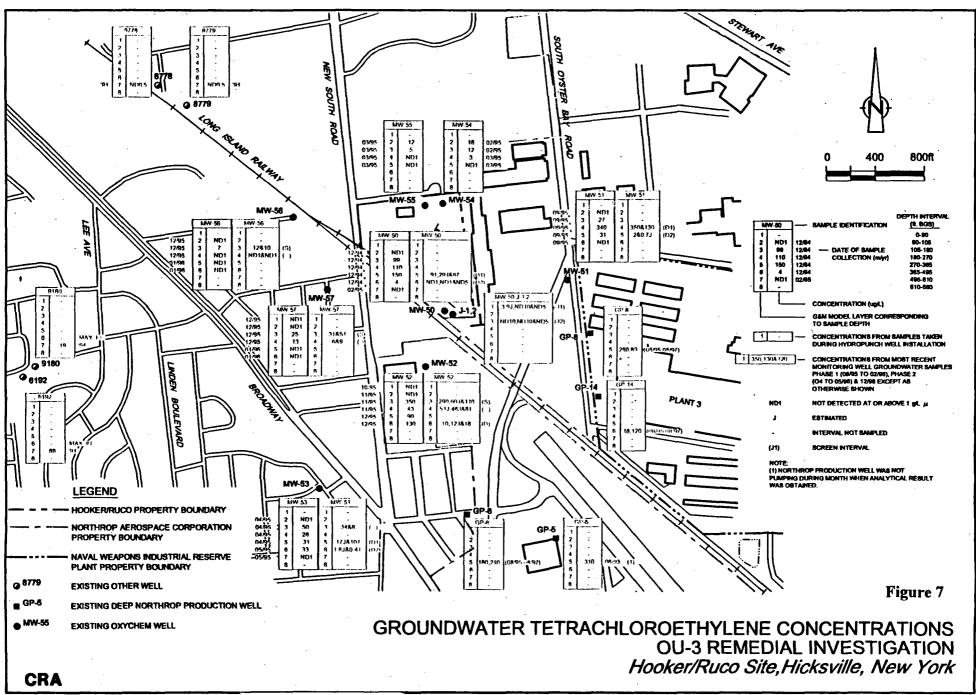
Figure 3

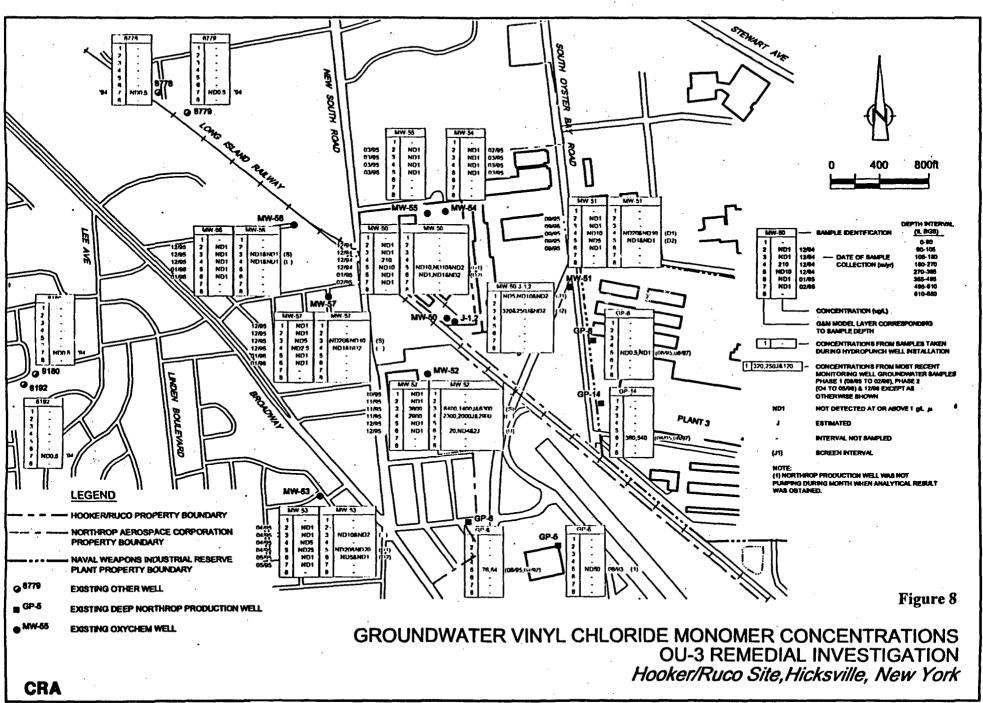
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APPENDIX II

TABLES

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TABLE 1

MID-1970s ANALYTICAL RESULTS FROM NORTHROP PRODUCTION WELL SAMPLING EVENTS (1)

OU-3 REMEDIAL INVESTIGATION

HOOKERVRUCO SITE, HICKSVILLE, NEW YORK

Well S No. GP-1 7	Trichlorod Sample Date - 7/12/76 9/26/78	ethylene Conc. (µg/l) 350 2000	Tetrachiore Sample Date 11/17/75 7/12/76 9/26/78	oethylene Conc. (µg/l) ND 490	Vinyl C Sample Date 11/17/75	Conc. (µg/I)	1,1,1-Trichl Sample Date	oroethane Conc. (µg/l)	1,1-Dichle Sample Date	oroethane Conç. (µg/l)	1,1-Dichlor Sample Date	oethylene Conc. (µg/l)	cis-1,2-Dichl Sample Date	oroethylene Conc. (µg/l)
<i>No.</i> GP-1 7	Date - 7/12/76 9/26/78	(μg/l) 350	Date 11/17/75 7/12/76	(µg/l) ND	Date	(µg/l)	•		•		•			
GP-1 7	_ 7/12/76 9/26/78	350	11/17/75 7/12/76	ND			Date	(µg/l)	Date	(ue/1)	Date	(uell)	Date	(µg/l)
	9/26/78	350	7/12/76		11/17/75	6115				1.9		(48,77	2	70.
. 9	9/26/78			490		ND	11/17/75	ND			7/11/78	ND 5	11/17/75	ND
•		2000	9/26/78		9/10/76	6	7/2/76	14					7/12/76	220
GP-2 9	9/10/76			10	7/11/78	0	10/22/78	5						
		240	10/27/76	19	9/10/76	60	10/27/76	25			٠		10/27/76	ND 10
. 1	1/17/77	120	1/17/77	16	1/17/77	90	1/17/77	37			7/25/78	15	1/17/77	28
` 8	8/10/78	200	12/5/78	22	7/11/78	0	12/5/78	22	•				12/5/78	NA
GP-3 10	10/27/76	570	12/8/76	18	12/8/76	20	9/16/76	20			10/17/78	ND 5	12/8/76	ND 10
1	1/17/77	860	1/17/77	11	1/17/77	270	1/17/77	10					1/17/77	8
. 8	8/22/78	510	10/17/78	18	8/22/78	0	10/17/78	. 3					12/12/78	NA
GP-4 1	12/8/76	25000	12/8/76	40	9/16/76	72	12/2/76	30					10/27/76	ND 10
GP-5	_	-	11/17/75	ND	11/17/75	ND	11/17/75	ND					11/17/75	ND
7	7/12/76	66	9/16/76	510	9/16/76 .	. 14	7/12/76	14					7/12/76	33
GP-6 4	4/1/74	ND	4/1/74	ND	4/1/74	ND	4/1/74	ND		,	7/11/78	ND5	4/1/74	ND
. 9	9/16/76	16	7/12/76	28	9/16/76	ND 5	7/12/76	10		•			7/12/76	23
8	8/22/78	56	8/22/78	330	8/22/78	48	7/11/78	ND 5						
GP-8 4	4/1/74	ND	4/1/74	ND	4/1/74	ND	4/1/74	ND		•			4/1/74	ND
	8/4/75	16	8/4/75	88			11/17/75	ND						
	7/12/76	56	7/12/76	120	9/10/76	6	9/10/76	130					7/12/76	83
GP-9 9	9/10/76	12	7/1/76	16	9/10/76	ND 5	7/1/76	7:2			10/10/78	5	7/12/76	4
	12/5/78	57	12/5/78	120	10/17/78	16	10/17/78	14				•	12/5/78	NA
GP-10 1	12/2/76	190	12/8/76	24	12/8/76	ND 10	12/2/76	120			7/11/78	8	12/2/76	ND 10
	2/12/78	100	12/12/78	20	7/11/78	0	12/12/78	44					12/5/78	NA

TABLE 1

MID-19706 ANALYTICAL RESULTS FROM NORTHROP PRODUCTION WELL SAMPLING EVENTS (1)

OU-3 REMEDIAL INVESTIGATION

HOOKER/RUCO SITE, HICKSVILLE, NEW YORK

Northrop	Trichloro	ethylene	Tetrachlor	oethylene	Vinyl Ci	hloride	1,1,1-Trichl	oroethane	1,1-Dichle	roethane	1,1-Dichlor	roethylene	cis-1,2-Dichi	loroethylene
Well No.	Sample Date	Conc. (µg/l)	Sample Date	Conc, (µg/l)	Sample Date	Conc. (µg/l)								
GP-11	11/30/76	60	11/30/76	54	12/7/76	ND 5	12/7/76	11			9/26/78	ND 5	12/7/76	ND 10
G1-11	4/1/77	25	4/1/77	36	4/1/77	ND 5	4/1/77	8			7/20/70	1100	4/1/77	ND 5
	9/26/78	26	9/26/78	15	9/26/78	0	9/26/78	. 5					1/1///	140 3
GP-13	11/30/76	39	12/7/76	ND 5	12/7/76	ND 5	11/30/76	1.4			7/11/78	ND 5	12/7/76	ND 10
	4/1/77	7	1/17/77	ND 50	4/1/77	ND 5	4/1/77	ND 5				•	4/1/77	ND 5
	8/10/78	8	7/25/78	ND 5	7/11/78	0	7/25/78	ND 5					12/12/78	NA
GP-14	4/1/74	ND	4/1/74	ND	4/1/74	ND	4/1/74	ND			7/11/78	ND 5	4/1/74	ND
-	8/4/75	500	8/4/75	65	8/4/75	50	11/17/75	ND					•	
•	7/12/76	30	7/12/76	79	12/8/76	17	7/12/76	5					7/12/76	1
	9/26/78	38	8/22/78	200	10/10/78	71	10/17/78	ND 5			•			
GP-15	11/30/76	59	11/30/76	19	12/7/76	ND 5	12/7/76	20			7/11/78	ND 5	12/7/76	ND 10
ž.	1/14/77	35	4/1/77	10	4/1/77	ND 5	1/17/77	47		·.			4/1/77	6
	8/22/78	7	7/11/78	ND5	8/10/78	ND 5	8/22/78	9						
GP-16	11/30/76	50	12/7/76	ND 5	12/7/76	7	11/30/76	. 31			9/26/78	ND 5	12/7/76	ND 10
·	1/17/77	17	1/17/77	ND 50	1/17/77	24	1/17/77	41					4/1/77	18
	9/26/78	42	12/5/78	ND 1	12/5/78	NA	12/5/78	15	ř				12/5/78	NA .

Notes:

(1) - Source - Nassau County Department of Health, Division of Environmental Services - chronological summary of Northrop well organics sampling.

NA - Not Analyzed.

ND - Not Detected.

NDx - Not Detected at or above x µg/L.

MID-1970s ANALYTICAL RESULTS FROM MUNICIPAL WELL SAMPLING EVENTS (1)

OU-3 REMEDIAL INVESTIGATION HOOKER/RUCO SITE, HICKSVILLE, NEW YORK

TABLE 2

Municipal	Trichloro	ethylene	Tetrachlo	roethylene	Vinyl C	hloride	1,1,1-Trick	loroethane	1,1-Dichio	roethane	: 1,1-Dichlore	ethulene	cis-1,2-Dichi	oroethvlene	
Well	Sample	Conc.	Sample	Conc.	Sample	Conc.	Sample	Conc.	Sample	Conc.	Sample	Conc.	Sample	Conc.	
No.	Date	(µg/l)	Date	(µg/l)	Date	(µg/l)	Date	(µg/1)	Date	(µg/l)	Date .	(µg/l)	Date	(μg/l)	
Hicksville											•				
H3-1/3488	12/6/76	ND 1	12/6/76	ND 5	11/29/76	68*	12/6/76	24					11/29/76	ND	
-1	1/13/77	ND 10	1/13/77	ND 10	12/6/76	ND 10	5/24/77	32					1/13/77	ND 10	
•					1/13/77	ND 10							-,,		
F13-2/8525	1/19/77	ND 10	1/19/77	ND 10	1/19/77	ND 10	1/19/77	ND 10	3/28/78	ND 1			1/19/77	ND 10	
	3/28/78	ND 1	3/28/78	ND I	3/28/78	NA	3/28/78	ND I					3/28/78	ND I	
H8-1/6192	12/20/76	4.3	12/20/76	9.3	12/20/76	ND 1	12/20/76	ND 1	1/25/78	ND 2	1/25/78	ND 6	12/20/76	14	
	1/13/77	ND 10	1/13/77	ND 10	1/13/77	ND 10	1/13/77	ND 10		•			1/13/77	ND 10	
•	1/25/78	ND 4	1/25/78	ND 2	1/25/78	NA	1/25/78	52	•				1/25/78	. ND 2	
H8-2/6193	11/1/75	ND	11/1/75	ND	11/1/75	ND	11/1/75	ND	1/25/78	ND 1	1/25/78	ND3	11/1/75	ND	
	3/4/77	ND 10	3/4/77	ND 10	3/4/77	ND 10	3/4/77	ND 10					3/4/77	ND 10	
	1/25/78	ND 4	7/7/78	1 .	1/25/78	NA	1/25/78	ND 2					1/25/78	ND1 1	
H8-3/9180	3/29/78	ND 2	3/29/78	ND 2	3/20/78	· NA	3/29/78	ND 2	3/29/78	ND 2	3/29/78	ND 4	3/29/78	ND 2	
H9-1/8778	12/20/76	ND 1	12/20/76	4 .	12/20/76	ND 1	12/20/76	ND 1	5/3/78	ND 1	5/3/78	ND 3	12/20/76	13	
	1/13/77	ND 10	1/13/77	ND 10	1/13/77	ND 10	1/13/77	. ND 10					1/13/77	ND 10	
	5/3/78	ND1	5/3/78	ND 1	5/3/78	NA	5/3/78	ND I			•		5/3/78	ND 1	
H9-2/8779	12/20/76	5.2	12/2/76	ND 2.5	12/2/76	ND 10	12/20/76	2.8	5/3/78	ND 1	5/3/78	ND 3	12/20/76	0.8	
	1/13/77	ND 10	1/13/77	ND 10	1/13/77	ND 10	1/13/77	ND 10					. 1/13/77	ND 10	
	5/3/78	ND 1	5/3/78	ND 1	5/3/78	NA	5/3/78	ND 1		•			5/3/78	ND I	
Levittown			٠				٠								
L6/3194	11/29/79	ND	11/29/76	ND	11/29/76	ND	11/29/76	ND	12/6/78	ND 1	12/6/78	ND 1	11/29/76	ND	
	4/12/78	ND I	4/12/78	ND 1	4/12/78	NA	4/12/78	ND 1	,			:	12/6/78	ND 1	
L6A/3618	11/29/76	ND .	11/29/76	ND	11/29/76	ND	11/29/76	ND					11/29/76	ND	
•	1/25/78	ND 4	1/25/78	ND 2	1/25/78	NA	1/25/78	ND 4			•		10/26/78	NA	

MID-1970s ANALYTICAL RESULTS FROM MUNICIPAL WELL SAMPLING EVENTS (1)

TABLE 2

OU-3 REMEDIAL INVESTIGATION HOOKERRUCO SITE, HICKSVILLE, NEW YORK

Municipal	Trichloro	ethylene	Tetrachion	oethylene	Vinyl C	hloride	1,1,1-Trich	loroethane	1,1-Dichlo	roethane	1,1-Dichlo	roethylene	cis-1,2-Dichl	oroethylene
Well	Sample	Conc.	Sample	Conc.	Sample	Conc.	Sample	Conc.	Sample	Conc.	Sample	Conc.	Sample	Conc.
No.	Date	(µg/l)	Date	(μg/l)	Date	(µg/I)	Date	(µg/l)	Date	(µg/l)	Date	(µg/l)	Date	(µg/I)
Levittown	•												•	
L10/4451	7/1/76	ND	7/12/76	ND	7/12/76	ND	7/12/76	ND	1/26/78	ND 1	1/26/78	ND 1	7/12/76	ND
,	3/15/78	ND 4	3/15/78	ND 2	3/15/78	NA	3/15/78	ND 2			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		1/26/78	ND 1
L5A/7076	1/3/77	5	1/18/77	ND 10	1/3/77	ND 10	1/18/77	ND 10	12/6/78	·ND 1	12/6/78	ND 1	1/18/77	ND 10
	3/1/78	ND 1	3/1/78	ND 1	3/1/78	NA	3/1/78	ND I					12/6/78	ND 1
												•		
Bethpage														
B6-1/3876	12/6/76	60	12/6/76	' 17	12/6/76	ND 10	12/6/76	15,					12/20/76	ND 1
	1/21/77	340	5/24/77	2.5	1/21/77	ND 10	1/21/77	300					1/21/77	ND 10
	12/27/78	87	12/27/78	4	3/14/78	NA	12/27/78	5					3/14/78	NA
B6-2/8941	12/2/76	ND	12/2/76	ND	12/2/76	ND	12/2/76	ND 1						
	12/20/76	2.6	12/20/76	1.4	12/20/76	ND 1	12/20/76	1.6	9/27/78	ND 1	9/27/78	ND 2	12/20/76	ND 1
,	10/20/77	ND 4	10/20/77	ND 2	10/20/77	NA	10/20/77	ND 2					10/20/77	NA
	9/27/78	ND 1	4/11/78	ND 1	4/11/78	NA	4/11/78	ND 1				•	9/27/78	ND 1
B10/6915	12/20/76	5.0	12/20/76	1.3	12/20/76	ND 1	12/20/76	ND 1	10/4/78	ND 1	10/4/78	ND 2	12/20/76	ND 1
•	10/4/78	ND 1	4/11/78	ND 1	4/11/78	ND	4/11/78	ND I				•	10/4/78	ND 1
B11/6916	11/1/75	ND	11/1/75	ND	11/1/75	ND	11/1/75	ND	9/27/78	ND 1	9/27/78	ND 2	11/1/75	ND
	12/20/76	7.0	12/20/76	1.3	12/20/76	ND 1	12/20/76	ND I			•		12/20/76	ND 1
	4/11/78	ND 1	4/11/78	ND 1	4/11/78	ND	4/11/78	ND 1					9/27/78	ND I

Notes

- (1) Source Nassau County Department of Health, Division of Environmental Services chronological summary of municipal well organics sampling.
- NA Not Analyzed.
- ND Not Detected.
- NDx Not Detected at or above x µg/L.
- - This detection of Vinyl Chloride was reported to have resulted from a lab error. A resampling of this well in the following 2 months confirmed the lab error.

. TABLE 3

1980s ANALYTICAL RESULTS FROM NORTHROP PRODUCTION WELL SAMPLING EVENTS (1) OU-3 REMEDIAL INVESTIGATION HOOKER/RUCO SITE, HICKSVILLE, NEW YORK

No. Date (ugll) Da	Northrop	Trichloro	ethylene	Tetrachlor	oethylene	Vinyl Cl	hloride	1,1,1-Trichl	oroethane	1,1-Dichlo	roethane	1,1-Dichlo	roethylene	cis-1,2-Dichl	oroethylene
GP-3 11/13/87 170 11/13/87 34 11/13/87 1 11/13/87 ND 4 GP-5 11/10/87 1200 11/10/87 110 4/4/80 15 11/10/87 20 11/10/87 ND 4 GP-6 3/22/89 ND 1 3/22/89 ND 4/4/80 2.6 3/22/89 ND 3/22/89 3 3/2 GP-8 11/13/87 65 11/13/87 120 4/4/80 11 11/13/87 68 11/13/87 ND 4 GP-9 11/13/87 79 11/13/87 5 11/13/87 3 11/13/87 52 11/13/87 ND 4 GP-10 11/13/87 42 11/13/87 6 11/13/87 2 11/13/87 5 11/13/87 ND 4 GP-11 11/10/87 17 11/10/87 7 11/10/87 1 11/10/87 2 11/13/87 ND 4 GP-13 11/10/87 ND 1 11/10/87 ND 1 11/10/87 ND 1 11/10/87 ND 1 11/10/87 ND 4 GP-14 11/10/87 43 11/10/87 130 11/10/87 27 11/10/87 1 11/10/87 ND 4 GP-14 11/10/87 43 11/10/87 130 11/10/87 27 11/10/87 1 11/10/87 ND 4 GP-14 11/10/87 43 11/10/87 130 11/10/87 27 11/10/87 1 11/10/87 ND 4 GP-14 11/10/87 43 11/10/87 130 11/10/87 27 11/10/87 1 11/10/87 ND 4 GP-14 11/10/87 43 11/10/87 130 11/10/87 27 11/10/87 1 11/10/87 ND 4 GP-14 11/10/87 43 11/10/87 130 11/10/87 27 11/10/87 1 11/10/87 ND 4 GP-14 3/20/89 42 3/20/89 130 3/21/88 250 3/21/88 3				•		•		•		•		•		Sample Date	Conc. (µg/l)
GP-5 11/10/87 1200 11/10/87 110 4/4/80 15 11/10/87 20 11/10/87 ND 4 GP-6 3/22/89 ND 1 3/22/89 ND 4/4/80 2.6 3/22/89 ND 3/22/89 3 3/22/89 SD 3/22/88 SD 3/22/88 SD 3/22/89 SD 3/22/88 SD 3/22/88 SD 3/22/88 SD 3/22/89 SD 3/22/88 SD 3/22/88 SD 3/22/88 SD 3/22/88 SD 3/22/88 SD 3/22/89 SD 3/22/88 SD 3/22/89 SD 3/22/88 SD 3/22/89 SD 3/22/88 SD 3/22/88 SD 3/22/88 SD 3/22/88 SD 3/22/88 SD 3/22/89 SD 3/22/88 SD 3/22/89 SD 3/22/88 SD 3/22/88 SD 3/22/88 SD 3/22/89 SD 3/22/88 SD 3/22/88 SD 3/22/88 SD 3/22/88 SD 3/22/89 SD 3/22/88 SD 3/22/88 SD 3/	GP-2	11/10/87	770	11/10/87	37	11/10/87	39	11/10/87	11	11/10/87	ND 4				·
GP-6 3/22/89 ND 1 3/22/89 ND 4/4/80 2.6 3/22/89 ND 3/22/89 3 3/22/89 3 3/22/89 ND 3/22/89 3 3/22/89 3 3/22/89 ND 3/22/89 3 3/22/89 3 3/22/89 ND 3/22/89 3 3/22/89 ND 3/22/89 3 3/22/89 3 3/22/89 ND 3/22/89 3 3/22/89 ND 11/13/87 93 ND 4 ND	GP-3	11/13/87	170	11/13/87	34			11/13/87	1	11/13/87	ND 4				
GP-8 11/13/87 65 11/13/87 120 4/4/80 11 11/13/87 68 11/13/87 ND 4 GP-9 11/13/87 79 11/13/87 5 11/13/87 3 11/13/87 52 11/13/87 ND 4 GP-10 11/13/87 42 11/13/87 6 11/13/87 2 11/13/87 5 11/13/87 ND 4 GP-11 11/10/87 17 11/10/87 7 11/10/87 1 11/10/87 2 11/13/87 ND 4 GP-13 11/10/87 ND 1 GP-14 11/10/87 43 11/10/87 130 11/10/87 27 11/10/87 1 11/10/87 ND 4 GP-14 11/10/87 43 11/10/87 130 11/10/87 27 11/10/87 1 11/10/87 ND 4 GP-14 11/10/87 43 11/10/87 130 11/10/87 27 11/10/87 1 11/10/87 ND 4 3/20/89 2 3/3/20/89 42 3/20/89 130 3/21/88 250 3/21/88 3	GP-5	11/10/87	1200	11/10/87	110			11/10/87	20	11/10/87	ND 4				
GP-9 11/13/87 79 11/13/87 5 11/13/87 3 11/13/87 52 11/13/87 ND 4 GP-10 11/13/87 42 11/13/87 6 11/13/87 2 11/13/87 5 11/13/87 ND 4 GP-11 11/10/87 17 11/10/87 7 11/10/87 1 11/10/87 2 11/13/87 ND 4 GP-13 11/10/87 ND 1 GP-14 11/10/87 43 11/10/87 130 11/10/87 27 11/10/87 1 11/10/87 ND 4 GP-14 11/10/87 43 3/20/89 130 3/21/88 250 3/21/88 3	GP-6	3/22/89	ND 1	3/22/89	ND	4/4/80	2.6	3/22/89	ND			3/22/89	3	3/22/89	ND
GP-10 11/13/87 42 11/13/87 6 11/13/87 2 11/13/87 5 11/13/87 ND 4 GP-11 11/10/87 17 11/10/87 7 11/10/87 1 11/10/87 2 11/13/87 ND 4 GP-13 11/10/87 ND 1 11/10/87 ND 4 GP-14 11/10/87 43 11/10/87 130 11/10/87 27 11/10/87 1 11/10/87 ND 4 3/20/89 2 3/3/20/89 42 3/20/89 130 3/21/88 250 3/21/88 3	GP-8	11/13/87	65	11/13/87	120	• •		11/13/87	68	11/13/87	ND 4				
GP-11 11/10/87 17 11/10/87 7 11/10/87 1 11/10/87 2 11/13/87 ND 4 GP-13 11/10/87 ND 1 11/10/87 ND 4 GP-14 11/10/87 43 11/10/87 130 11/10/87 27 11/10/87 1 11/10/87 ND 4 3/20/89 2 3/3/20/89 42 3/20/89 130 3/21/88 250 3/21/88 3	GP-9	11/13/87	79	11/13/87	5 .	11/13/87	3	11/13/87	52	11/13/87	ND 4				
GP-13 11/10/87 ND 1 11/10/87 ND 1 11/10/87 ND 1 11/10/87 ND 1 11/10/87 ND 4 GP-14 11/10/87 43 11/10/87 130 11/10/87 27 11/10/87 1 11/10/87 ND 4 3/20/89 2 3/3/20/89 42 3/20/89 130 3/21/88 250 3/21/88 3	GP-10	11/13/87	42	11/13/87	6	11/13/87	2	11/13/87	5	11/13/87	ND 4			·	
GP-14 11/10/87 43 11/10/87 130 11/10/87 27 11/10/87 1 11/10/87 ND 4 3/20/89 2 3/3/20/89 42 3/20/89 130 3/21/88 250 3/21/88 3	GP-11	11/10/87	17	11/10/87	7	11/10/87	1	11/10/87	2	11/13/87	ND4				
3/20/89 42 3/20/89 130 3/21/88 250 3/21/88 3	GP-13	11/10/87	. ND 1	11/10/87	ND 1	11/10/87	ND I	11/10/87	ND 1	11/10/87	ND 4				,
GP-15 11/13/87 12 11/13/87 3 11/13/87 1 11/13/87 4 11/13/87 ND 4	GP-14			• •						11/10/87	ND 4	3/20/89	1	3/20/89	14
	GP-15	11/13/87	12	11/13/87	3	11/13/87	1	11/13/87	4 :	11/13/87	ND 4				
GP-16 11/10/87 8 11/10/87 ND 1 11/10/87 6 11/10/87 7 11/13/87 ND 4	GP-16	11/10/87	8	11/10/87	ND 1	11/10/87	6	11/10/87	· 7	11/13/87	ND 4				

Notes:

NDx - Not Detected at or above x µg/L.

^{(1) -} Sources - New York State Department of Health, Division of Laboratories and Research. April 15, 1980 Memorandum. Northrop Aerospace Corporation Production Well Water Quality Reports. Feldman et al., 1992.

ND - Not Detected.

TABLE 4

1980s ANALYTICAL RESULTS FROM MUNICIPAL WELL SAMPLING EVENTS (1) OU-3 REMEDIAL INVESTIGATION HOOKER/RUCO SITE, HICKSVILLE, NEW YORK

Municipal	Trichloroe	thylene	Tetrachlore	pethylene	Vinyl C	hloride	1,1,1-Trichl	oroethane	1,1-Dichlo	roethane	1,1-Dichlor	oethylene	cis-1,2-Dichle	proethylene
Well No.	Sample Date	Conc. (µg/l)	Sample . Date	Conc. (µg/l)	Sample Date	Conc. (µg/1)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)
<u>Hicksville</u>		. •										70		70
H3-2/8525	3/11/81	ND 1	3/20/80	ND 2	3/11/81	ND 1	3/11/81	ND 2	3/11/81	ND 1	3/11/81	ND 1	. 3/11/81	ND 1
H8-1/6192	10/20/80	ND 4	1/2/81	ND 2	3/10/81	ND 1	10/20/80	ND 2	10/20/80	ND 1	10/20/80	ND 1	3/10/81	ND I
H8-2/6193	10/20/80	ND 4	10/20/80	ND 2	3/25/81	ND 1	10/20/80	ND 2	10/20/80	ND 1	10/20/80	ND 1	3/25/81	ND 1
H8-3/9180	1/21/81	ND 4	1/29/81	1	6/12/80	ND 0.5	1/2/81	ND 2	3/13/80	ND 1	3/13/80	ND 1	3/13/80	ND I
H9-1/8778	6/6/80	ND 4	6/6/80	ND 2	1/29/81	ND 1	3/4/80	ND 3	1/29/81	ND 1	3/4/80	ND 2	1/29/81	ND 1
H9-2/8779	6/6/80	ND 4	6/6/80	ND 2	3/10/81	ND1	6/6/80	ND 2	3/10/81	ND 1	3/10/81	ND 1	3/10/81	ND 1
<u>Levittown</u>					•	•	•		• `					
L5A/7076	4/23/80	ND 4	7/30/80	ND3	6/26/80	ND 0.5	7/30/80	ND3	÷	-	••		4/23/80	NA
LH6A/3618	7/30/80	ND 3	7/30/80	ND3	6/26/80	ND 0.5	2/6/81	2	- ,	 .	· _		6/26/80	NA
L10/4451	5/8/80	ND 4	2/24/81	3	6/26/80	ND 0.5	3/18/80	ND3			-	~	6/26/80	NA
Bethpage		•												
B6-2/8941	5/20/80	ND 4	5/20/80	ND 2	3/11/81	ND 1	5/20/80	ND 2	8/21/80	ND 1	8/21/80	ND 1	8/21/80	ND 1
B10/ 69 15	5/5/81	ND 4	5/5/81	ND 2	6/11/80	ND 0.5	5/5/81	ND 2	8/21/80	ND 1	7/19/81	ND 1	8/21/80	ND I
B11/6916	11/5/80	ND 4	11/5/80	ND 2	2/19/81	ND 1	11/5/80	ND 2	2/19/81	ND I	2/19/81	ND 1	2/19/81.	ND I

Notes

(1) - Source = Nassau County Department of Health, Division of Environmental Services - chronological summary of municipal well organics sampling.

NA - Not Analyzed.

ND - Not Detected.

NDx - Not Detected at or above x µg/L.

EARLY 1990s ANALYTICAL RESULTS FROM NORTHROP PRODUCTION WELL SAMPLING EVENTS (1)
OU-3 REMEDIAL INVESTIGATION

HOOKER/RUCO SITE, HICKSVILLE, NEW YORK

TABLE 5

Northrop	Trichloro	ethylene	Tetrachlo	roethylene	Vinyl C	hloride	1,1,1-Trich	loroethane	1,1-Dichle	oroethane	1,1-Dichlo	roethylene	cis-1,2-Dich	loroethylene
Well No.	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/1)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)
GP-1	8/24/93	2800	8/24/93	ND 200										
GP-2	8/30/93	3000	8/30/93	52j	8/30/93	ND 200	8/30/93	24J	8/30/93	ND 200	8/30/93	30 J	8/30/93	ND 200
GP-5	8/30/93	23	8/30/93	11	8/30/93	ND 200								
GP-6	9/18/92	160	9/23/93	67	9/18/92	550	9/23/93	28	9/18/92	3	9/23/93	17	9/23/93	43
GP-8	8/30/93	240	8/30/93	310	8/30/93	ND 50	8/30/93	550	8/30/93	11J	8/30/93	420	8/30/93	ND 50
GP-10 ·	12/6/91	110	12/6/91	9	12/6/91	ND 10	12/6/91	20j	12/6/91	ND 5	12/6/91	7	12/6/91	ND 5
GP-11	12/6/91	100	12/6/91	10	12/6/91	ND 10	12/6/91	17J	12/6/91	ND 5	12/6/91	7	12/6/91	ND 5
GP-13	12/6/91	26	12/6/91	2)	12/6/91	ND 10	12/6/91	6]	12/6/91	ND 5	12/6/91	2]	12/6/91	ND 5
· GP-14	9/23/93	120	6/5/90	88	8/30/93	370	6/22/92	12	8/30/93	ND 20	6/22/92	4	9/23/93	-14
GP-15	12/6/91	6	12/6/91	2)	12/6/91	ND 10	12/6/91	ND 5						

Notes:

(1) - Source - RI Report, Northro/Grumman Aerospace Corporation, Bethpage, New York, Geraghty and Miller, Inc., September 1994. NDx - Not Detected at or above x µg/L.

J - Estimated value.

TABLE 6

EARLY 1990s ANALYTICAL RESULTS FROM MUNICIPAL WELL SAMPLING EVENTS (1) OU-3 REMEDIAL INVESTIGATION HOOKER/RUCO SITE, HICKSVILLE, NEW YORK

Municipal	Trichloro	•	Tetrachlor	,	Vinyl Cl		1,1,1-Trichl		1,1-Dichlo		1,1-Dichlor	oethylene	cis-1,2-Dichl	oroethylene
Well No.	Sample Date	Conc. (µg/l)												
<u>Hicksville</u>												٠		
H3-2/8525	12/12/94	ND 0.5	12/12/94	1	12/12/94	ND 0.5								
H8-1/6192	12/12/94	2.7	12/12/94	88	12/12/94	ND 0.5								
H8-3/9180	12/12/94	ND 0.5	12/12/94	18	12/12/94	ND 0.5								
H9-1/8778	12/12/94	ND 0.5												
H9-2/8779	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	0.7	12/12/94	1.1	12/12/94	ND 0.5	12/12/94	ND 0.5
H9-3/10208	12/12/94	0.7	12/12/94	ND 0.5										
Bethpage	,								•					•
B6-1/3876	9/2/93	200	9/2/93	- 6.5	9/2/93	ND 0.5	9/2/93	2.4	9/2/93	ND 0.5	9/2/93	4.2	9/2/93	1.7
B6-2/8941	9/2/93	0.5	9/2/93	ND 0.5	9/2/93	ND 0.5	9/2/93	ND 0.5	9/2/93	ND 0.5	9/2/93	ND 0.5	9/2/93	ND 1
B10/6915	9/2/93	ND 0.5	9/2/93	ND 1										
B11/6916	9/2/93	ND 0.5	9/2/93	ND 1										

Notes:

(1) - Sources: Hicksville municipal well water quality data for 1994, H2M group. RI Report, Northrop Aerospace Corporation, Bethpage, New York, Geraghty and Miller, Inc., September 1994. NDx - Not Detected at or above x µg/L.

SUMMARY OF ORGANIC COMPOUNDS MONITORING WELL RESULTS OU-3 REMEISIAL INVESTIGATION HOOKER/RUCO STE, HICKSVILLE, NEW YORK

Location:	GP-14	GP-#	GP-6	MW	-50 D1	MW	-50 1)2		MW-50]2	MW	-5011	Groundwa Dischary
Sample Date:	8/1/95	8/1/95	N/1/95	R/R/95	5/02/96	8/8/95	5/02/96	8/1/95	5/01/96	8/8/95	5/01/96	ARAR
Units:		(µg/L)	(μg/L) ´	· (µg/1.)	(μg/L)	(μg/L)	(µg/L)	(µg/L)	(μg/L)	(µg/L)	(µg/L)	
CL Volatiles			•					,				
Thloromethane	ND 0.5	ND 0.5	ND 1	ND 10	ND 10	ND 1	ND I	ND 10	NDIO / NDIO	ND 5	ND 10	5
/inyl chloride	360	ND 0.5	" 76	ND 10	ND 10	ND 1	ND I	320 3	[250] / 250] []	ND 5	ND 10	2
cetone	11)	R	R	R	R	R	R	R	1301 / 531	R	470)	50
lethylene Chloride	ND 2	ND 2	ND 2	ND 10	ND 10	ND 2	ND I	ND 10	NDIO / NDIO	ND 5	ND 10	5
Carbon Disulfide	ND 0.5	ND 0.5	ND 1	ND 10	ND 10	ND 1	ND 1	ND 10	NDIO NDIO	ND 5	ND 10	50
,1-Dichloroethylene	ND 0.5	360)	f 14j	ND 10	ND 10	ND I	ND 1	ND 10	ND10 / ND10	ND 5	ND 10	5
,1-Dichloroethane	1	12	3	ND 10	ND 10	ND 1	ND 1	ND 10	ND10 / ND10	ND 5	ND 10	5
,2-Dichloroethylene (total)	1.6	4.1	Kiri ya rri;	51	201	ND 1	ND 1	17 7	36) 7:36) 177	1.6]	ND 10	5
Chloroform	ND 0.5	ND 5.3	ND I	ND 10	ND 10	ND 1	ND I	ND 10	NDIO / NDIO	ND 5	ND 10	7
,2-Dichloroethane	ND 0.5	ND 0.5	ND I	ND 10	ND 10 -	ND I	ND I	ND 10	ND10 / ND10	ND 5	ND 10	0.6
-Butanone (MEK)	R	· R	R	R	R	R	. R	R	R/R	R	R	50
,1,1-Trichloroethane	1.1	390	5 to 1	1.55	ND 10	ND 1	ND 1	ND 10	ND10 / ND10	3.5	ND 10	5
Carbon tetrachloride	ND 0.5	0.63	ND 1	ND 10	ND 10	ND t	ND I	ND 10	NDIO / NDIO	ND 5	ND 10	3
Bromodichloromethane	ND 0.5	ND 0.5	ND I	ND 10	ND 10	ND 1	ND I	ND 10	ND10 / ND10	ND 5	ND 10	50
richloroethylene	25	220	110	240	````100]``\	ND 1	ND 1	' ND 10	ND10 / ND10	10.7	ND 10	. 5
,1,2-Trichloroethane	ND 0.5	, 1.4	ND 1	ND 10	ND 10	ND 1	ND 1	ND 10	ND10 / ND10	ND 5	ND 10	. 1
lenzene	ND 0.5	ND 0.5	ND 1	ND 10	ND 10	ND 1	ND I	ND 10	NDIO / NDIO	ND 5	ND 10	0.7
Tetrachloroethylene	F: 18 1	260	180	' '9l	29]	ND 1	ND I	ND 10	NDIO / NDIO	3.91	ND 10	5
Toluene	ND 0.5	ND 0.5	ND 1	ND 10	ND 10	ND I	ND I	ND 10	ND10 / ND10	ND 5	ND 10	5
Chlorobenzene	ND 0.5	ND 0.5	0. <u>22</u> j	ND 10	ND 10	ND 1	ND 1	ND 10	NDIO / NDIO	ND 5	ND 10	5
Ethylbenzene	ND 0.5	ND 0.5	ND I	ND 10	ND 10	ND I	ND 1	ND 10	ND10 / ND10	0.943	ND 10	5
(ylene (total)	ND 0.5	ND 0.5	ND 1	ND 10	ND 10	ND 1	ND I	ND 10	NDIO / NDIO	4)	ND 10	5
TCL Semivolatiles	•		٠						•			
Thenol	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND40 / ND10	ND 10	[73 17 T	1.
,2-Dichlorobenzene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND40 / ND10	ND 10	ND 10	3
-Methylphenol	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND40 / ND10	ND 10	23	1.
Vaphthalene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	3J / ND10	ND 10	ND 10	50
-Methylnaphthalene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND40 / ND10	ND 10	ND 10	NL
Dimethylphthalate '	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND40 / ND10	ND 10	ND 10	50
Nethylphthalate	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND40 / ND10	ND 10	ND 10	50
N-n-butylphthalate	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	0.8j	ND 10	ND40 / ND10	ND 10	ND 10	50
lutylbenzylphthalate	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND40 / ND10	ND 10	ND 10	50
is(2-Ethylhexyl)phthalate	ND 10	ND 10	ND 10	11	11	56 .7	ND 10	ND 10	ND40 / ND10	ND 10	ND 10	50
otal TICs	2)	4)	ND	650)	26)	240}	413	180)	530] 7 2500] 7	3400)	13007	50 ⁽¹⁾
esticides/PCBs	NA	NA	NA.	NA	NA	ND	NA	ND	NA / NA	ND	NA	•
oles												
CL - Target Compound List	NA -	Not Analyzed								•		
Da - Not detected at or above a µg/	١٠,		idual Compo	ound								
Associated value is estimated.		- Sum of cor	•						•			
- Only were rejucted.	Edail.	 Exceeded / 	AKAR									

TABLE 7

SUMMARY OF ORGANIC COMPOUNDS MONITORING WELL RESULTS OU-3 REMEDIAL INVESTIGATION AUGUST 1995 - MAY 1996

			MV	V-5J									Groundwate
Location:		53 D2		llow		53 D1		-51D1	MW-			MW-525	Discharge
Sample Date:	8/8/95	4/29/96	8/8/95	4/29/96	8/8/ 95	4/30/96	2/22/96	4/30/96	2/23/96	4/30/96	2/21/96	5/01/96	ARAR
Units:	(µg/L)	(μ g/L)	(µg/L)	(μg/l.)	(µg/1.)	(µg/L)	(µg/L)	(pg/L)	(µg/L)	(μ g/L)	(µg/L)	(μ g/L)	
TCL Volatiles				•									
Chloromethane	ND 5	0.9j	ND 10	ND 2	ND 20	ND 20	ND 20	ND IO	ND 1	ND 1	ND 200	ND50 / ND50	5
Vinyl chloride	ND 5	ND I	ND 10	ND 2	ND 20	ND 20	ND 20	ND 10	ND I	ND I	57 6400 T	F 14001 / 14001	2
Acetone	R	R	R	R	R	- R	R	R	R	R	R	R / 300143	50
Methylene Chloride	ND 5	ND 1	ND 10	ND 2	ND 20	્ ૄેં 9 j\ંી	ND 20	4]	ND 1	ND 1	ND 200	221 / ND50	5
Carbon Disulfide	ND 5	0.9]	ND 10	ND 2	ND 20	ND 20	ND 20	ND 10	ND 1	11;	ND 200	ND50 / ND50	50
1,1-Dichloroethylene	2.6	ND I	ND 10	7.31 %	1.3)	ND 20	7 390	100	ND 1	0.23	ND 200	ND50 / ND50	5
1,1-Dichloroethane	3.3j	1	ND 10	ND 2	ND 20	ND 20	20 1	- eg -47	0.43]	0.65	ND 200	ND50 / ND50	5
1,2-Dichloroethylene (total)	0.65)	0.3J	10 17	2	- 🛅 🐯 🐣	49 57	ND 20	2)	ND 1	ND 1	ND 200	77 201 7 261	5
Chloroform	ND 5	ND 1	ND 10	, ND 2	ND 21	ND 20	77 98	77 22 77	26	3	520	ND50 / 19	7
1,2-Dichloroethane	ND 5	0.4J	ND 10	ND 2	ND 20	ND 20	ND 20	ND 10	ND 1	ND 1	ND 200	ND50 / ND50	0.6
2-Butanone (MEK)	761	R	R	R	R	R	R	R	R	R	R	R / R	50
1,1,1-Trichloroethane	2.9}	1	1.8)	20	2.1)	2J	520	16073	0.67)	ND 1	ND 200	ND50 / ND50	5
Carbon tetrachloride	ND 5	ND 1	ND 10	ND 2	ND 20	ND 20	ND 20	ND 10	ND 1	ND 1	ND 200	ND50 / ND50	5
Bromodichloromethane	ND 5	ND 1	ND 10	ND 2	ND 20	ND 20	7.21	ND 10	2.4	ND 1	ND 200	ND50 / ND50	50
Trichloroethylene	5	1	260 T	47 (a)	F 440	T" 330 T	340	150	ND 1	ND I	220	17, 461 / 521	5
1,1,2-Trichloroethane	ND 5	ND 1	ND 10	ND 2	ND 20	ND 20	ND 20	ND 10	ND 1	ND I	ND 200	ND50 / ND50	1
Benzene	2.4	7.74	ND 10	ND 2	ND 20	ND 20	ND 20	ND 10	ND I	ND 1	ND 200	ND50 / ND50	0.7
Tetrachloroethylene	1.8)	0.41	34 17	8	C 171	101	350	FF 130	2.3	0.71		511 / 601 TT	5
Toluene	ND 5	0.41	ND 10	ND 2	ND 20	51	ND 20	ND 10	ND 1	0.2]	ND 200	ND50 / ND50	5
Chlorobenzene	ND 5	ND 1	ND 10	ND 2	ND 20	ND 20	ND 20	ND 10	ND 1	ND 1	ND 200	ND50 / ND50	3
Ethylbenzene	0.391	ND I	ND 10	ND 2	ND 20	21	ND 20	ND 10	ND 1	ND I	ND 200	ND50 / ND50	5
Xylene (total)	2]	ND 1	ND 10	0.45	ND 20	13)	ND 20	ND 10	ND 1	ND 1	ND 200	ND50 / ND50	5
TCL Semipolatiles							,		•				
Phenol	ND 10	3773174	ND 10	75 m 17	ND 10	F7.45 FF	ND 10	ND 10	ND 10	ND 10	ND 10	NDIO / NDIO	1*
1.2-Dichlorobenzene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	[F. [6]	Land Philad	ND 10	ND 10	ND 10	ND10 / ND10	3
4-Methylphenol	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	NDIO / NDIO	1*
Naphthalene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	NDIO / NDIO	50
2-Methylnaphthalene	0.35	ND 10	ND 10	ND 10	ND 10	.ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	NDIO / NDIO	NL
Dimethylphthalate	ND 10	ND 10	ND 10	ND 10	0.7]	0.91	81	2)	ND 10	ND 10	ND 10	NDIO / NDIO	50
Diethylphthalate	ND 10	ND 10	ND 10	0.61	ND 10	. 23	ND 10	ND 10	0.2}	ND 10	ND 10	NDIO / NDIO	50
Di-n-butylphthalate	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	NDIO / NDIO	50
Butylbenzylphthalate	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	NDIO / NDIO	50
bis(2-Ethylhexyl)phthalate	38	30	ND 10	20	19	671	ND 10	ND 10	ND 10	ND 10	ND 10	ND10 / ND10	50
Total TICs	190)	28j	270j	38J	240j	140)	291	101	47]	130J	65 J	313	50 ⁽¹⁾
Pesticides/PCBs	ND	NA	ND	NA	ND	NA	NA	NA .	NA	NA	NA .	NA / NA	
Notes:					•								
TCL Target Compound List	N ·	Not Analyz	rd										
ND n Not detected at or above n	PE/L (1 -	Each Indi	vidual Com	pound								•	
J - Associated value is estimat	ed.		ebnuogme	•									
R Data were rejected.	F.73.		•										
TiCa Tentative identified Comp	sunde NL	Not Listed											
ND Not Detected		•											

SUMMARY OF ORGANIC COMPOUNDS MONITORING WELL RESULTS **OU-3 REMEDIAL INVESTIGATION** AUGUST 1995 - MAY 1996

Location	он: М	W-52 8	· MW	-52D	MW-	565	MW	-561	MW	-57 S	ми	V-57 1	Groundwater Discharge
Sample Da	te: 2/22/96	5/01/96	2/21/96	5/01/96	2/19/96	4/29/96	2/19/96	4/29/96	2/20/96	4/30/96	2/20/96	4/30/96	ARAR
Lini	its: (µg/L)	(μ g/L)	(μ g/L .)	(μ g/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(μ g/L)	(µg/L)	(μg/L)	(µg/L)	
TCL Volatiles	•						•						
Chloromethane	ND 100	ND 100	ND 10	ND 4	ND 1	ND 1	ND I	ND 1	ND 20	ND 10	ND 1	ND 2	5
Vinyl chloride	2300	2000)	20	ND 4	ND 1	ND I	ND 1	ND I	ND 20	ND 10	ND I	ND 2	2
Acetone	R	1400)	F 330J -	R	R	R	R	R	R	R	18)	R	50
Methylene Chloride	ND 100	[15 420]	ND 12	ND 4	ND 1	ND 2	ND 1	ND 1	ND 20	Luga.	ND 1	ND 2	5
Carbon Disulfide	ND 100	ND 100	ND 10	ND 4	- ND 1	ND 1	ND 1	ND 1	ND 20	ND 10	ND 1	ND 2	50
1,1-Dichloroethylene	ND 100	ND 100	ND 10	ND 4	0.38}	ND 1	ND 1	ND 1	ND 20	ND 10	ND 1	0.7]	5
1,1-Dichloroethane	ND 100	ND 100	ND 10	ND 4	0.46]	0.5j	ND 1	0.5}	ND 20	ND 10	1.5	2	5
1,2-Dichloroethylene (total)	ND 100	40)	ND 10	43	The is min	[77]479	ND 1	ND 1	346	180 7	F 14 7	10	5
Chloroform	P 140 "	\$ 2.1905 ht	ND 10	ND 4	ND 1	ND 1	· ND 1	ND 1	63	ND 10	ND I	ND 2	7
1,2-Dichloroethane	ND 100	ND 100	ND 10	ND 4	ND 1	ND 1	ND 1	ND I	ND 20	ND 10	ND 1	ND 2	0.6
2-Butanone (MEK)	R	R	, R	R	R	R	R	R	R	R	ĸ	R	50
1,1,1-Trichloroethane	ND 100	ND 100	ND 10	ND 4	5.4 77	4	ND 1	ND 1	ND 20	ND 10	3.5	` 4	5
Carbon tetrachloride	ND 100	ND 100	ND 10	ND 4	ND 1	ND 1	ND 1	. 0 :	NO 20	ND 10	ND I	ND 2	5
Bromodichloromethane	223	ND 100	ND 10	ND 4	ND 1	ND 1	ND 1	ND I	6.8]	ND 10	ND 1	ND 2	50
Trichloroethylene	FF 110 14	F 90f	76 36	38]	11 4	12	ND 1	ND 1	620 7	7"240	11.34	55	5
1,1,2-Trichloroethane	ND 100	ND 100	ND 10	ND 4	ND 1	ND 1	ND 1	· ND 1	ND 20	ND 10	ND I	ND 2	1
Benzene	ND 100	361 3	ND 10	ND 4	ND 1	ND 1	ND 1	ND 1	ND 20	ND 10	ND 1	ND 2	0.7
Tetrachloroethylene	PATE BOOK	46)	10	12]	12 12	7(1077	, ND I	ND I	31	5}	F1.8.41.1	7 9 7 7	5
Toluene	ND 100	- 1 (44) ²⁴	ND 10	ND 4	ND I	0.6)	ND 1	ND 1	ND 20	0.3]	ND 1	ND 2	5
Chlorobenzene	ND 100	ND: 100	ND 10	ND 4	ND I	ND 1	ND I	ND I	ND 20	ND 10	ND 1	ND 2	5
Ethylbenzene	ND 100	4]	ND 10	. ND 4	0.26]	0.25	ND I	ND 1	ND 20	ND 10	ND 1	ND 2	5
Xylene (total)	ND 100	म्याशीस	ND 10	ND 4	. 2	1	ND 1	ND 1	ND 20	ND 10	ND 1	ND 2	5
TCl, Semipolatiles													
Phenol	ND 10	ND 10	ND 10	ND 10	ND 10	THE STATE	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	1.
1,2-Dichlorobenzene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	P. 9j '''	3
4-Methylphenol	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	1*
Naphthalene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	50
2-Methylnaphthalene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	NL
Dimethylphthalate	. ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	2)	50
Diethylphthalate	ND 10	ND 10	ND 10	ND 10	0.3)	ND 10	ND 10	ND 10	0.43	ND 10	ND 10	ND 10	50
Di-n-butylphthalate	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	50
Butylbenzylphthalate	ND 10	ND 10	ND 10	ND 10	ND 10	4)	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	50 .
bis(2-Ethylhexyl)phthalate	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	NĎ 10	ND 10	ND 10	ND 10	ND 10	50
Total TICs	31]	11)	77 j	ND	173	21]	24)	7]	14J	9]	12]	14j	50 ⁽¹⁾
Pesticides / PCBs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Notes													

(1) - Each Individual Compound

- Sum of compounds
Exceeded ARAR
NL Not Listed

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER PREDESIGN INVESTIGATION HOOKER/RUCO SITE HICKSVILLE, NEW YORK

Parameters			Location ID:	GP-6		GP-8		GP-14	
	Units	TBC Criteria	Collection Date:	08/01/95	08/18/97	08/01/95	08/18/97	08/01/95	08/18/97
				•				•	
TCL Volatiles									
Vinyl chloride	μg/L	2		76	64	ND 0.5	ND 1	360	540
Chloroethane	μg/L	NL						-	
Methylene chloride	μg/L	NL		ND 2	ND 1	ND 2	ND 1	ND 2	ND 1
Acetone	μg/L	50 .		, R	10	R	ND 1	'' 11 J	54
Carbon disulfide	µg/L	50		ND I		ND 0.5	- -	ND 0.5	
1,1-Dichloroethene	μg/L	NL	•	, 14 J	11	360 J	290	ND 0.5	7
1,1-Dichloroethane	μg/L	NL		3	·	12		1	
1,2-Dichloroethene(total)	μg/L	. 5	,	94	160	4.1	5	1.6	25
2-Butanone	μg/L	50		R	29	R	16	R	4
Chloroform	μg/L	. 7		ND 1	ND 1	ND 5.3	11	ND 0.5	2
1,1,1-Trichloroethane	μg/L	NL		10	7	390	200	1.1	13
Carbon tetrachloride	μg/L	NL		ND I	ND 1	0.63	ND 1	ND 0.5	1
Bromodichloromethane	μg/L	NL		ND 1		ND.0.5		ND 0.5	
Trichloroethene	μg/L	5		110	140	220	160	25	210
Benzene	μg/L	0.7		ND 1	ŅD 1	ND 0.5	ND 1	ND 0.5	ND 1
1,1,2-Trichloroethane	μg/L	NL		ND 1	_	1.4	_	ND 0.5	
4-Methyl-2-pentanone	μg/L	50		_	ND 1	_	ND 1	_	ND 1
2-Hexanone	µg/L	NL			-	-	_		
Tetrachloroethene	μg/L	-5		180	210	260	89	18	120
Toluene	μg/L	NL		ND 1	ND 1	ND 0.5	ND 1	ND 0.5	ND 1
Chlorobenzene	μg/L	5		0.22]		ND 0.5		ND 0.5	
Ethylbenzene	μg/L	5		ND I		ND 0.5	<u></u> .	ND 0.5	
Xylene(total)	μg/L	5		ND I	ND 1	ND 0.5	ND 1	ND 0.5	3
Total TICs	ug/L	50 (1)		ND .	ND .	ND SIS	ND	ND	ND

HOOKER/RUCO SITE

Parameters	Units	TBC Criteria	Location ID: Collection Date:	GP-6		GP-8		GP-14	
				08/01/95	08/18/97	08/01/95	08/18/97	08/01/95	08/18/97
TCL Semi-Volatiles		٠							
Phenol	µg/L	NŁ		ND 10		ND 10		ND 10	-
4-Methylphenol	µg/L	NL		ND 10		ND 10		ND 10	
Naphthalene ,	µg/L	50		ND 10		ND 10	. 	ND 10	
Diethylphthalate	µg/L	NL		ND 10		ND 10	·	ND 10	_
Di-n-butylphthalate	µg/L	50		ND 10.		ND 10		ND 10	
bis(2-Ethylhexyl)phthalate	µg/L	50		ND 10	-	ND 10 -		ND 10	
Butylbenzylphthalate	µg/L	NL		ND 10	<i>,</i> *	ND 10		ND 10	
Di-n-octylphthalate	μg/L·	• 50	4	ND 10		ND 10		ND 10	-
Total TICs	μg/L	50 (1)		ND		4 J		2 J	
PCBs									
Aroclor-1242	μg/L	NL			-				

Notes:

- (1) Each individual TIC cannot exceed 50 µg/L
- NDx Not detected at or above x
- TCL Target Compound List
- Reported value is estimated
- R Reported value was rejected
- Not Analyzed
- NL Not Listed in Table 5.2 of Predesign Work Plan For Operable Unit-1, Revision 2, dated January 1999
 - Exceeds TBC Criteria
- 27/23 Duplicate Analysis

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER PREDESIGN INVESTIGATION HOOKER/RUCO SITE HICKSVILLE, NEW YORK

			Location ID:	R	-1	A	-1	D	-1
		TBC	Collection Date:	01/25/90	12/14/98	01/25/90	12/14/98	01/15/90	12/14/98
Parameters	Units	Criteria	•						,
TCL Volatiles									
Vinyl chloride	μg/L	2		ND 0.17	ND 2	ND 0.17	ND 2	ND 0.17	ND 2
Chloroethane	μg/L	- NL		ND 0.1	ND 10	ND 0.1	ND 10	ND 0.1	ND 10
Methylene chloride	μg/L	NL		ND 0.03	ND 10	2 R	ND 10	ND 0.03	ND 10
Acetone	µg/L	50		ND 10	ND 10	ND 10	ND 10	6 RJ	ND 10
Carbon disulfide	μg/L	50		ND 5	ND 10	ND 5	ND 10	ND 5	ND 10
1,1-Dichloroethene	μg/L	NL		ND 0.12	ND 10	ND 0.12	ND 10	ND 0.12	ND 10
1,1-Dichloroethane	µg/L	NL		ND 0.04	ND 10 .	ND 0.04	ND 10	ND 0.04	ND 10
1,2-Dichloroethene(total)	μg/L	, 5		ND 0.1	ND 5	ND 0.1	ND 5	54 J	39
2-Butanone	μg/L	50	•	ND 10					
Chloroform	µg/L	7		ND 0.03	ND 7	ND 0.03	ND 7	ND 0.03	ND 7
1,1,1-Trichloroethane	μg/L	NL		ND 0.08	ND 10	ND 0.08	ND 10 ·	ND 0.08	ND 10
Carbon tetrachloride	µg/L	NL		ND 0.21	ND 10	ND 0.21	ND 10	ND 0.21	ND 10
Bromodichloromethane	μg/L	NL		ND 0.08	ND 10	ND 0.08	ND 10	ND 0.08	ND 10
Trichloroethene	μg/L	5		ND 0.19	ND 5	ND 0.19	ND 5	18	14
Benzene	μg/L	0.7		ND 0.04	ND 0.7	ND 0.04	ND 0.7	ND 0.04	ND 0.7
1,1,2-Trichloroethane	μg/L	NL		ND 0.1	ND 10	ND 0.1	ND 10	ND 0.1	ND 10
4-Methyl-2-pentanone	µg/L	50	•	ND 10					
2-Hexanone	μg/L	NL	•	ND 10					
Tetrachloroethene	μg/L	- 5		· 51	11	ND 0.14	ND 5	98	82
Toluene	μg/L	NL		ND 0.15	ND 10	ND 0.11	ND 10	ND 0.11	ND 10
Chlorobenzene	µg/L	5		ND 0.04	ND 5	ND 0.04	ND 5	ND 0.04	ND 5
Ethylbenzene	μg/L	5		ND 0.06	ND 5	ND 0.06	ND 5	ND 0.06	ND 5
Xylene(total)	μg/L	5		ND 0.1	ND 5	ND 0.1	ND 5	ND 0.1	ND 5
Total TICs	μg/L	50 (1)		ND	ND		ND	•••	ND

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER PREDESIGN INVESTIGATION HOOKER/RUCO SITE HICKSVILLE, NEW YORK

		TBC ts Criteria							• • •	
Parameters	Units		Location ID: Collection Date:	R	-1	A	-1	D	-1	
				01/25/90	12/14/98	01/25/90	12/14/98	01/15/90	12/14/98	
TCL Semi-Volatiles			•			•				
Phenol	µg/L	NL		ND 10						
4-Methylphenol	µg/L	NL		ND 10						
Naphthalene	μg/L	50		ND 10						
Diethylphthalate	µg/L	NL		ND 10						
Di-n-butylphthalate	µg/L	50		ND 10						
bis(2-Ethylhexyl)phthalate	μg/L	50		2 RJ	ND 10	4 RJ	ND 10	ND 26 R	ND 10	
Butylbenzylphthalate	µg/L	NL		ND 10						
Di-n-octylphthalate	µg/L	, 50	٠.	ND 10	ND 10	ND 10	ND 10	ND 2 J	ND 10	
Total TICs	µg/L	50 (1)	.•	ND	14	ND	68	ND	2	
PCBs										
Aroclor-1242	μg/L	NL		ND 0.5		ND 0.05		ND 0.05	· -	

Notes:

- (1) Each individual TIC cannot exceed 50 µg/L
- NDx Not detected at or above x
- TCL Target Compound List
- J Reported value is estimated
- R Reported value was rejected
- Not Analyzed
- NL Not Listed in Table 5.2 of Predesign Work Plan For Operable Unit-1, Revision 2, dated January 1999 Exceeds TBC Criteria
- 27/23 Duplicate Analysis

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER PREDESIGN INVESTIGATION HOOKER/RUCO SITE HICKSVILLE, NEW YORK

			Location ID:	P-1		E-1		E-2	
		TBC	Collection Date:	01/30/90	12/15/98	01/16/90	12/15/98	01/16/90	12/15/98
Parameters	Units	Criteria							
TCL Volatiles			*			•			
	/1	-		021	ND 2	15	17	8	ND 2
Vinyl chloride	µg/L	2		83 J			- -		
Chloroethane	μg/L	NL		ND 0.1	ND 10	ND 0.1	ND 10	ND 0.1	ND 10
Methylene chloride	μg/L	NL		ND 0.03	ND 10	ND 0.03	ND 10	ND 0.03	ND 10
Acetone	µg/L	50		ND 10	58 J	8 RJ	ND 10J	2 RJ	ND 10J
Carbon disulfide	μg/L	50		11 R	ND 10	5 R	ND 10	4 RJ	ND 10
1,1-Dichloroethene	μg/L	NL		ND 0.12	ND 10	ND 0.12	ND 10	ND 0.12	ND 10
1,1-Dichloroethane	μg/L	NL		ND 0.04	ND 10	ND 0.04	ND 10	ND 0.04	ND 10
1,2-Dichloroethene(total)	µg/L	5		21	2,5	19 J	46	12 J	ND 5
2-Butanone	μg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Chloroform	μg/L	7		ND 0.03	ND 7	ND 0.03	ND 7	ND 0.03	ND 7
1,1,1-Trichloroethane	μg/L	NL		ND 0.08	ND 10	ND 0.08	ND 10	ND 0.08	ND 10
Carbon tetrachloride	μg/L	NL		ND 0.21	ND 10	ND 0.21	ND 10	ND 0.21	ND 10
Bromodichloromethane	μg/L	NL	,	ND 0.08	ND 10	ND 0.08	ND 10	ND 0.08	ND 10
Trichloroethene	μg/L	5		ND 0.19	ND 5	ND 0.19	2j	2	ND 5
Benzene	µg/L	0.7	•	ND 0.04	ND 0.7	ND 0.04	ND 0.7	ND 0.04	ND 0.7
1,1,2-Trichloroethane	μg/L	NL		ND 0.1	ND 10	ND 0.1	ND 10	ND 0.1	ND 10
4-Methyl-2-pentanone	μg/L	50		320]	ND 10	19	ND 10	ND 10	ND 10
2-Hexanone	μg/L	NL		8 RJ	ND 10	ND 10	ND 10	ND 10	ND 10
Tetrachloroethene .	µg/L	5		ND 0.14	ND 5	ND 0.14	4}	ND 0.14	ND 5
Toluene	μg/L	NL		ND 0.11	ND 10	ND 0.11	ND 10	ND 0.11	· 4J
Chlorobenzene	μg/L	. 5		6	ND 5	2	ND 5	ND 0.04	ND 5
Ethylbenzene	μg/L	5	•	8	ND 5	3	ND 5	ND 0.06	ND 5
Xylene(total)	μg/L	5		15	ND 5	6	ND 5	ND 0.1	ND 5
Total TICs	μg/L	50 (1)		-	134	-	111	-	ND

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER PREDESIGN INVESTIGATION. HOOKER/RUCO SITE HICKSVILLE, NEW YORK

			Location ID:	p.	-1	E	-1	E-	-2
Parameters .	Units	TBC Criteria	Collection Date:	01/30/90	12/15/98	01/16/90	12/15/98	01/16/90	12/15/98
TCL Semi-Volatiles									
Phenoi	μg/L	NL		ND 10	ND 10J				
4-Methylphenol	μg/L	NL		ND 10	ND 10J				
Naphthalene	µg/L	50		ND 10	ND 10	2 J	ND 10	ND 10	ND 10
Diethylphthalate	μg/L	NL		ND 10					
Di-n-butylphthalate	µg/L	50		ND 10					
bis(2-Ethylhexyl)phthalate	µg/L	50		4 RJ	ND 10	2 RJ	ND 10	12 R	ND 10
Butylbenzylphthalate	μg/L	NL		ND 10					
Di-n-octylphthalate	μg/L	50		ND 10					
Total TICs	μg/L	50 (1)		4200	222	130	73	2310	650
PCBs								•	
Aroclor-1242	μg/L	NL	•	ND 0.05	2.0	ND 0.05	ND 1.0	ND 0.05	ND 1.0

Notes:

- (1) Each individual TIC cannot exceed 50 µg/L
- NDx Not detected at or above x
- TCL Target Compound List
 - J Reported value is estimated
- R Reported value was rejected
- Not Analyzed
- NL Not Listed in Table 5.2 of Predesign Work Plan For Operable Unit-1, Revision 2, dated January 1999 Exceeds TBC Criteria
- 27/23 Duplicate Analysis

TABLE 8

			Location ID:	K-1 (G	M-9S)	K-2 (C	SM-91)	MW-	-50]1
•		TBC	Collection Date:	02/02/90	12/15/98	02/02/90	12/15/98	01/23/90	08/08/95
Parameters	Units	Criteria							
TCL Volatiles					•				
Vinyl chloride	μg/L	2		ND 0.17	ND 2	ND 0.17	3	ND 0.17	ND 5
Chloroethane	μg/L	NL		ND 0.1	ND 10	ND 0.1	ND 10	ND 0.1	ND 5
Methylene chloride	μg/L	NL		ND 0.03	ND 10	10 R	ND 10	ND 0.03	ND 5
Acetone	µg/L	50		ND 10	ND 10J	ND 10	ND 10	20 R	R
Carbon disulfide	µg/L	50		ND 5	ND 10	ND 5	ND 10	. 11 R	ND 5
1,1-Dichloroethene	µg/L	NL		ND 0.12	ND 10	ND 0.12	ND 10	ND 0.12	ND 5
1,1-Dichloroethane	μg/L	NL		ND 0.04	ND 10 .	ND 0.04	ND 10	ND 0.04	ND 5
1,2-Dichloroethene(total)	μg/L	· 5		ND 0.1	ND 5	ND 0.1	ND 5	2 J	1.6 J
2-Butanone	μg/L	50		ND 10	ND 10	ND 10	ND-10	ND 10	R
Chloroform	μg/L	. 7		ND 0.03	ND 7	ND 0.03	ND 7	ND 0.03	ND 5
1,1,1-Trichloroethane	μg/L	NL	•	ND 0.08	ND 10	ND 0.08	ND 10	ND 0.08	5.6
Carbon tetrachloride	μg/L	NL		ND 0.21	ND 10	ND 0.21	ND 10	ND 0.21	ND 5
Bromodichloromethane	μg/L	NL		ND 0.08	ND 10	ND.0.08	ND 10	ND 0.08	ND 5
Trichloroethene	μg/L	5		ND 0.19	ND 5	ND 0.19	ND 5	ND 0.19	10
Benzene	μg/L	0.7		ND 0.04	ND 0.7	ND 0.04	ND 0.7	ND 0.04	ND 5
1,1,2-Trichloroethane	μg/L	NL		ND 0.1	ND 10	ND 0.1	ND 10	ND 0.1	ND 5
4-Metifyi-2-pentanone	μg/L	50		ND 10	ND 10	ND 10	ND 10	11 J	ND 25
2-Hexanone	μg/L	NL		ND 10	ND 25				
Tetrachloroethene '	μg/L	5		ND 0.14	ND 5	ND 0.14	ND 5	ND 0.14	3.9 J
Toluene	μg/L	NL	•	ND 0.11	ND 10	ND 0.11	ND 10	ND 0.11	ND 5
Chlorobenzene	μg/L	. 5		ND 0.04	ND 5	ND 0.04	ND 5	ND 0.04	ND 5
Ethylbenzene	μg/L	5	•	ND 0.06	ND 5	ND 0.06	ND 5	ND 0.06	0.94 J
Xylene(total)	µg/L	5		ND 0.1	ND 5	ND 0.1	ND 5	· 2 J	4 J
Total TICs	μg/L	50 (1)			ND	-	ND	_	-

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER PREDESIGN INVESTIGATION HOOKER/RUCO SITE HICKSVILLE, NEW YORK

		-	Location ID:	K-1 (G	M-9S)	K-2 (0	GM-91)	MW-50J1	
,		TBC	Collection Date:	02/02/90	12/15/98	02/02/90	12/15/98	01/23/90	08/08/95
Parameters	Units	Criteria							
TCL Semi-Volatiles				•					
Phenol	μg/L	NL		ND 10	ND 10J	ND 10	ND 10	ND 10	ND 10
4-Methylphenol	μg/L	NL	,	ND 10	ND 10J	ND 10	ND 10	ND 10	ND 10
Naphthalene	µg/L	50		ND 10					
Diethylphthalate	µg/L	NL		ND 10	· ND 10				
Di-n-butylphthalate	µg/L	50		ND 10					
bis(2-Ethylhexyl)phthalate	µg/L	50		ND 10	ND 10	ND 10	ND 10	2 RJ	ND 10
Butylbenzylphthalate	µg/L	NL		ND 10					
Di-n-octylphthalate	μg/L	50		ND 10					
Total TICs	µg/L	50 (1)		1000	41	ND	250	5100	3400J
PCBs						,			•
Aroclor-1242	µg/L	NL		ND 0.05		ND 0.05		ND 0.5	ND 1

Notes:

- (1) Each individual TIC cannot exceed 50 µg/L
- NDx Not detected at or above x
- TCL Target Compound List
- J Reported value is estimated
- R Reported value was réjected
- Not Analyzed
- NL Not Listed in Table 5.2 of Predesign Work Plan For Operable Unit-1, Revision 2, dated January 1999

 Exceeds TBC Criteria
- 27/23 Duplicate Analysis

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER PREDESIGN INVESTIGATION HOOKER/RUCO SITE HICKSVILLE, NEW YORK

			Location ID:	MW-	50]1		1	MW-50/2	•
		TBC	Collection Date:	05/01/96	12/16/98	01/18/90	08/08/95	05/01/96	12/16/98
Parameters	Units	Criteria							
TCL Volatiles									
Vinyl chloride	μg/L	2		ND 10	ND 2	29	320	250]/250]	ND 2/ND 2
Chloroethane	μg/L	NL		ND 10	ND 10	ND 0.1	ND 10	ND10/ND10	ND 10/ND 10
Methylene chloride	µg/L	NL	•	ND 10	ND 10	ND 0.03	ND 10	ND 10/ND 10	ND 10/ND 10
Acetone	μg/L	. 50	•	407 J	41	ND 10	R	R/R	ND 10/ND 10
Carbon disulfide	μg/L	. 50	•	ND 10	ND 10	ND 5	ND 10	ND 10/ND 10	ND 10/ND 10
1,1-Dichloroethene	μg/L	NL		ND 10	ND 10	ND 0.12	ND 10	ND 10/ND 10	ND 10/ND 10
1,1-Dichloroethane	μg/L	NL		ND 10	ND 10	ND 0.04	ND 10	ND 10/ND 10	ND 10/ND 10
1,2-Dichloroethene(total)	μg/L	5		ND 10	ND 5	3]	17	36J/36J	ND5/ND5
2-Butanone	μg/L	50		. R	ND 10	3 RJ	R	R/R	ND 10/ND 10
Chloroform	μg/L	7		ND 10	ND 7	ND 0.03	ND 10	ND 10/ND 10	ND
1.1.1-Trichloroethane	μg/L	NL		ND 10	ND 10	ND 0.08	ND 10	ND 10/ND 10	ND 10/ND 10
Carbon tetrachloride	μg/L	NL		ND 10	ND 10	ND 0.21	ND 10	ND 10/ND 10	ND
Bromodichloromethane	μg/L	NL		ND 10	ND 10	ND 0.08	ND 10	ND 10/ND 10	ND
Trichloroethene	μg/L	5	4.	ND 10	ND 5	ND 0.19	ND 10	ND 10/ND 10	ND5/ND5
Benzene	μg/L	0.7		ND 10	ND 0.7	ND 0.04	ND 10	ND 10/ND 10	ND 0.7/ND 0.7
1,1,2-Trichloroethane	μg/L	NL		ND 10	ND 10	ND 0.1	ND 10	ND 10/ND 10	ND 10/ND 10
4-Methyl-2-pentanone	μg/L	50		R	ND 10J	ND 10	ND 50	R/R	ND 10J/ND 10J
2-Hexanone	μg/L	NL .		R	ND 10	ND 10	ND 50	R/R	ND 10/ND 10
Tetrachloroethene	μg/L	5		ND 10	ND 5	ND 0.14	ND 10	ND 10/ND 10	ND5/ND5
Toluene	μg/L	NL	÷	ND 10	ND 10	7 R	ND 10	ND 10/ND 10	ND 10/ND 10
Chlorobenzene	μg/L	5		ND 10	ND 5	ND 0.04	ND 10	ND 10/ND 10	ND 5/ND 5
Ethylbenzene	µg/L	5		ND 10	ND 5	71	ND 10	ND 10/ND 10	ND 5/ND 5
Xylene(total)	μg/L	5		ND 10	4j	6]	ND 10	ND 10/ND 10	ND 5/ND 5
Total TICs	μg/L	50 (1)			493	, -			27/23

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER PREDESIGN INVESTIGATION HOOKER/RUCO SITE HICKSVILLE, NEW YORK

			Location ID:	MW-	50]1		,	MW-50J2	
Parameters	Units	TBC Criteria	Collection Date:	05/01/96	12/16/98	01/18/90	08/08/95	05/01/96	12/16/98
TCL Semi-Volatiles									
Phenol	µg/L	NL		17	ND 10	ND 10	ND 10	ND 40/ND 10	ND 10/ND 10
4-Methylphenol	μg/L	NL		23	ND 10	ND 10	ND 10	ND 40/ND 10	ND 10/ND 10
Naphthalene	µg/L	50.		ND 10	ND 10	ND 10	ND 10	3J/ND 10	ND 10/ND 10
Diethylphthalate	µg/L	NL		· ND 10	ND 10	ND 10	ND 10	ND 40/ND 10	ND 10/ND 10
Di-n-butylphthalate	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND 40/ND 10	ND 10/ND 10
bis(2-Ethylhexyl)phthalate	µg/L	50		ND 10	ND 10	2 RJ	ND 10	ND 40/ND 10	ND 10/ND 10
Butylbenzylphthalate	μg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 40/ND 10	ND 10/ND 10
Di-n-octylphthalate	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10/ND 10
Total TICs	μg/L	50 (1)		1300J	802	130	180J	530J/2500J	60/53
PCBs									
Aroclor-1242	µg/L	NL			-	ND 0.5	ND 1	-/-	/

Notes:

- (1) Each individual TIC cannot exceed 50 µg/L
- NDx Not detected at or above x
- TCL Target Compound List ·
- J Reported value is estimated
- R Reported value was rejected
- Not Analyzed
- NL Not Listed in Table 5.2 of Predesign Work Plan For Operable Unit-1, Revision 2, dated January 1999 Exceeds TBC Criteria
- 27/23 Duplicate Analysis

TABLE 8

			Location ID:		MW-50D1			MW-50D2		Composite-1
		TBC	Collection Date:	08/08/95	05/02/96	12/19/98	08/08/95	05/02/96	12/16/98	12/16/98
Parameters	Units	Criteria				•				
TCL Volatiles							•			
Vinyl chloride	µg/L	2 -		ND 10	ND 10	ND 2	ND 1	ND 1	ND 2	ND 2
Chloroethane	μg/L	NL		ND 10	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10
Methylene chloride	µg/L	NL		ND 10	ND 10	ND 10	ND 2	ND 1	ND 10	ND 10
Acetone	μg/L	50		R	R	ND 10	R	R	ND 10	7 J
Carbon disulfide	μg/L	50		ND 10	ND 10	ND 10	ND	ND	ND 10	ND 10
1,1-Dichloroethene	μg/L	NL		ND 10	ND 10	1 J	ND 1	· ND 1	ND 10	ND 10
1.1-Dichloroethane	μg/L	NL	,	ND 10	ND 10	. 2 J	ND 1	ND 1	ND 10	ND 10
1,2-Dichloroethene(total)	μg/L	5		51	20 J	14	ND 1	ND 1	ND 5	ND 5
2-Butanone	μg/L	50	•	R	R	ND 10	R	R	ND 10	ND 10
Chloroform	μg/L	7		ND 10	ND 10	ND 7	ND 1	ND 1	ND 7	ND 7
1.1.1-Trichloroethane	μg/L	NL		1.5 J	ND 10	· 2 J	ND 1	ND 1	ND 10	ND 10
Carbon tetrachloride	μg/L	NL		ND 10	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10
Bromodichloromethane	μg/L	NL		ND 10	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10
Trichloroethene	μg/L	5		240	100 }	110	ND 1	ND 1	ND 5	ND 5
Benzene	μg/L	0.7		ND 10	ND 10	ND 0.7	ND 1	ND 1	ND 0.7	ND 0.7
1,1,2-Trichloroethane	μg/L	NL		ND 10	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10
4-Methyl-2-pentanone	μg/L	50		ND 50	R	ND 10	ND 5	R	ND 10	ND 10
2-Hexanone	μg/L	NL		ND 50	R	ND 10	ND 5	R ·	ND 10	ND 10
Tetrachloroethene	μg/L	5		91	29 J	67	ND 1	ND 1	ND 5	ND 5
Toluene	µg/L	NL	•	ND 10	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10
Chlorobenzene	μg/L	5		ND 10	ND 10	ND 5	ND 1	ND 1	ND 5	ND 5
Ethylbenzene	µg/L	5		ND 10	ND 10	ND 5	ND 1	ND 1	ND 5	ND 5
Xylene(total)	μg/L	5		ND 10	ND 10	ND 5	ND 1	ND 1	ND 5	ND 5
Total TICs	μg/L μg/L	50 (1)		ND	ND 10	7	ND	ND	ND	187

•			Location ID:		MW-50D1	•		MW-50D2		Composite-1
		TBC (Collection Date:	08/08/95	05/02/96	12/19/98	08/08/95	05/02/96	12/16/98	12/16/98
Parameters	Units	Criteria								
TCL Semi-Volatiles				•						٠.
Phenol	μg/L	NL		ND 10	ND 10	ND 10J	ND 10	ND 10	ND 10	ND 10
4-Methylphenol	μg/L	NL		ND 10	ND 10	ND 10j	ND 10	ND 10	ND 10	ND 10
Naphthalene	μg/L	50		ND 10	ND 10	ND 10J	ND 10	ND 10	ND 10	ND 10
Diethylphthalate	μg/L	NL		ND 10	ND 10	ND 10J	ND-10	ND 10	ND 10	ND 10
Di-n-butylphthalate	μg/L	50		ND 10	ND 10	ND 'loj	ND 10	0.8J	ND 10	ND 10
bis(2-Ethylhexyl)phthalate	μg/L	50		11	11	ND 10J	ND 10	ND 10	ND 10	ND 10
Butylbenzylphthalate	μg/L	NL -		ND 10	ND 10	ND 10J	56	ND 10	ND 10	ND 10
Di-n-octylphthalate	μg/L	50		ND 10	ND 10	ND 10]	ND 10	ND 10	ND 10	ND 10
Total TICs	µg/L	50 (1)		650J	26 J	16	240]	41J	85	544
PCBs					•					
Aroclor-1242	μg/L	NL			••					

Notes:

- (1) Each individual TIC cannot exceed 50 µg/L
- NDx Not detected at or above x
- TCL Target Compound List
- J Reported value is estimated
- R Reported value was rejected
- Not Analyzed
- NL Not Listed in Table 5.2 of Predesign Work Plan For Operable Unit-1, Revision 2, dated January 1999 Exceeds TBC Criteria
- 27/23 Duplicate Analysis

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER PREDESIGN INVESTIGATION HOOKER/RUCO SITE HICKSVILLE, NEW YORK

			Location ID:		MW-521			MW-52S	
Parameters	Units	TBC Criteria	Collection Date:	02/22/96	05/01/96	12/17/98	02/21/96	05/01/96	12/17/98
TCL Volatiles			•						
Vinyl chloride	μg/L	2		2300	2000]	2900	6400	1400J/1400J	6300
Chloroethane	μg/L	NL		ND 100	ND 100	ND 10	ND 200 -	ND50/ND50	9 j
Methylene chloride	μg/L	NL		ND 100	420J	ND 10	ND 200	22J/ND 50	ND 10
Acetone	μg/L	50		R	1400J	ND 10	R	R/300J	ND 10
Carbon disulfide	μg/L .	50		ND 100	ND 100	ND 10	ND 200	ND 50/ND 50	ND 10
1,1-Dichloroethene	μg/L	NL		ND 100	ND 100	2j	ND 200	ND 50/ND 50	3]
1,1-Dichloroethane	μg/L	NL		ND 100	ND 100 ,	ND 10	ND 200	ND 50/ND 50	ND 10
1,2-Dichloroethene(total)	μg/L	,5		ND 100	405	હ0	ND 200	23J/26J	63
2-Butanone	μg/L	50		R	R	ND 10	R	R/R	ND 10
Chloroform	μg/L	. 7		140	190 J	ND 7	520	ND 50/19J	ND 7.
1,1,1-Trichloroethane	µg/L	NL	·	ND 100	ND 100	ND 10	ND 200	ND 50/ND 50	ND 10
Carbon tetrachloride	μg/L	NL		ND 100	ND 100	ND 10	ND 200	ND 50/ND 50	ND 10
Bromodichloromethane	μg/L	NL		22 j	ND 100	ND 10	ND 200	ND 50/ND 50	ND 10
Trichloroethene	μg/L	. 5		110	90J	120	220	46]/52]	71
Benzene	μg/L	0.7		ND 100	365	ND 0.7	ND 200	ND 50/ND 50	2
1,1,2-Trichloroethane	μg/L	NL		ND 100	ND 100	ND 10	ND 200	ND 50/ND 50	. ND 10
4-Methyl-2-pentanone	μg/L	50		ND 100	R	ND 10J	ND 200	R/R	ND 10J
2-Hexanone	μg/L	NL		ND 100	R	ND 10	R	R/R	ND 10
Tetrachloroethene	μg/L	5		53 J	4 6J	81	290	51)/60J	110
Toluene	µg/L	NL		ND 100	44]	ND 10	ND 200	ND 50/ND 50	2j
Chlorobenzene	μg/L	5		ND 100	ND 100	ND 5	ND 200	ND 50/ND 50	ND 5
Ethylbenzene	µg/L	. 5		ND 100	4J	ND 5	ND 200	ND 50/ND 50	2]
Xylene(total)	μg/L	5		ND 100	12j	· 4J	ND 200	ND 50/ND 50	5
Total TICs	μg/L	50 (1)		ND	· 9	9	ND.	ND/ND	54

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER PREDESIGN INVESTIGATION HOOKER/RUCO SITE HICKSVILLE, NEW YORK

			Location 1D:		MW-521	,		MW-52S	
		TBC	Collection Date:	02/22/96	05/01/96	12/17/98	02/21/96	05/01/96	12/17/98
Parameters	Units	Criteria	•						
TCL Semi-Volatiles									
Phenol	μg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10
4-Methylphenol	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10
Naphthalene	μg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10
Diethylphthalate	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10
Di-n-butylphthalate	μg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10
bis(2-Ethylhexyl)phthalate	μg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10
Butylbenzylphthalate	μg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10
Di-n-octylphthalate	μg/L	5 0		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10
Total TICs	µg/L	50 (1)		31J	11J	146	65J	31J	175
PCBs					•				
Aroclor-1242	μg/L	NL		 `	•				

Notes:

- (1) Each individual TIC cannot exceed 50 µg/L
- NDx Not detected at or above x
- TCL Target Compound List .
 - J Reported value is estimated
- R Reported value was rejected
- Not Analyzed
- NL. Not Listed in Table 5.2 of Predesign Work Plan For Operable Unit-1, Revision 2, dated January 1999 Exceeds TBC Criteria
- 27/23 Duplicate Analysis

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER PREDESIGN INVESTIGATION HOOKER/RUCO SITE HICKSVILLE, NEW YORK

•			Location ID:		MW-52D			GM-10I		Composite-2
		TBC	Collection Date:	02/21/96	05/01/96	12/17/98	10/25/91	08/27/93	12/17/98	12/16/98
Parameters	Units	Criteria		4		*-		٠		
TCL Volatiles								•		
Vinyl chloride	μg/L	2		20	ND 4	2J	ND10/ND10	ND 10	ND 2	3000
Chloroethane	μg/L	NL		ND 10	ND 4	ND 10	ND10/ND10	ND 10	ND 10	5]
Methylene chloride	μg/L	NL	*	ND 12	ND 4	ND 10	ND5/ND5	ND 10	ND 10	ND 10
Acetone	µg/L	50	•	330]	R	ND 10	ND12/ND10	ND 10	ND 10	ND 10
Carbon disulfide	μg/L	50	•	ND 10	ND 4	ND 10	ND5/ND5	ND 10	ND 10	ND 10
1,1-Dichloroethene	µg/L	NL		ND 10	ND 4	2)	2]/3]	3 J	ND 10	ND 10
1,1-Dichloroethane	μg/L	NL		ND 10	ND 4	, 3 j	ND5/ND5	ND 10	ND 10	ND 10
1,2-Dichloroethene(total)	µg/L	5		ND 10	45	3]	3]/3]	ND 10	2]	54
2-Butanone	μg/L	50	•	- R	R	ND 10	R/R	ND 10	ND 10	ND 10
Chloroform.	μg/L	7		ND 10	ND 4	ND 7	ND5/ND5	ND 10	ND 7	ND 7
1,1,1-Trichloroethane	µg/L	NL	•	ND 10	ND 4	. 2 j	7/10	. 5J	2 J	ND 10
Carbon tetrachloride	μg/L	· NL		ND 10	ND 4	ND 10	ND5/ND5	ND 10	ND 10	ND 10
Bromodichloromethane	μg/L	NL		ND 10	ND 4	ND 10	, ND5/ND5	ND 10	ND 10	ND 10
Trichloroethene	μg/L	. 5		36	38]	29	25/32	19	7	76
Benzene	µg/L	0.7	•	ND 10	ND 4	ND 0.7	ND5/ND5	ND 10	ND 0.7	1
1.1.2-Trichloroethane	μg/L	NL	•	ND 10	ND 4	ND 10	ND5/ND5	ND 10	ND 10	ND 10
4-Methyl-2-pentanone	μg/L	50		ND 10	R	ND 10J	ND10/ND10	ND 10	ND 10J	ND 10
2-Hexanone	μg/L	NL		R	R	ND 10	ND10/ND10	ND 10	ND 10	ND 10
Tetrachloroethene	µg/L	5		10	12j	18	6/7	6]	45	74
Toluene	μg/L	NL		ND 10	ND 4	ND 10	ND5/ND5	ND 10	ND 10	ND 10
Chlorobenzene	µg/L	5	•	ND 10	ND 4	ND 5	ND5/ND5	ND 10	. ND 5	ND 5
Ethylbenzene	µg/L	5		ND 10	ND 4	ND 5	ND5/ND5	ND 10	ND 5	ND 5
Xylene(total)	μg/L	5		ND 10	ND 4	ND 5	ND5/ND5	. ND 10	ND 5	. 3J
Total TICs	μg/L	50 (1)	•	ND	ND	ND	-/-		ND	ND

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER PREDESIGN INVESTIGATION HOOKER/RUCO SITE HICKSVILLE, NEW YORK

			Location ID:		MW-52D			GM-10I		Composite-2
•		TBC	Collection Date:	02/21/96	05/01/96	12/17/98	12/17/98	12/17/98	12/17/98	12/16/98
Parameters	Units	Criteria								•
TCL Semi-Volatiles							•	•		
Phenol	μg/L	NL		ND 10	ND 10	ND 10J			ND 10	ND 10
4-Methylphenol	μg/L	NL		ND 10	ND 10	ND 10J			ND 10	ND 10
Naphthalene	μg/L	50	÷	ND 10	ND 10	ND 10J ·			ND 10	ND 10
Diethylphthalate	μg/L	NL		ND 10	ND 10	ND 10J		••	ND 10	ND 10
Di-n-butylphthalate	μg/L	50		ND 10	ND 10	ND 10J	, 	• •-	ND 10	ND 10
bis(2-Ethylhexyl)phthalate	μg/L	50		ND 10	ND 10	ND 10J	• •	••	ND 10	ND 10
Butylbenzylphthalate	μg/L	NL		ND 10	ND 10	1J			ND 10	ND 10
Di-n-octylphthalate	μg/L	50		ND 10	ND 10	3.5J	• ••		ND 10J	ND 10
Total TICs	μg/L	50 (1)		77]	ND	13j	••	••	34	252
PCBs				•		•		*		
Aroclor-1242	μg/L	NL				**		~ -		

Notes:

- (1) Each individual TIC cannot exceed 50 µg/L
- NDx Not detected at or above x
- TCL Target Compound List
- 1 Reported value is estimated
- R Reported value was rejected
- Not Analyzed
- NL Not Listed in Table 5.2 of Predesign Work Plan For Operable Unit-1, Revision 2, dated January 1999 Exceeds TBC Criteria
- 27/23 Duplicate Analysis

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER PREDESIGN INVESTIGATION HOOKER/RUCO SITE HICKSVILLE, NEW YORK

			Location ID:	F-1		F-2		I-1		1-	- 2 ·
Parameters	Units	TBC Criteria	Collection Date:	01/18/90	12/18/98	01/18/90	12/18/98	01/17/90	12/19/98	01/17/90	12/19/98
TCL Volatiles											
Vinyl chloride	μg/L	2		ND 0.017	7	ND 0.017	1]	ND 0.017/ND 0.017	ND 2	94 J	45
Chloroethane	μg/L	NL		ND 0.1	ND 10	ND 0.1	ND 10	ND 0.1/ND 0.1	ND 10	ND 0.1	2J
Methylene chloride	μg/L	NL		2 RJ	ND 10	1 R	ND 10	ND 0.03/ND 0.03	ND 10	ND 0.03	ND 10
Acetone	μg/L	50		35 R	ND 10	7 RJ	ND 10	ND 10/ND 10	ND 10	ND 10	ND 10
Carbon disulfide	μg/L	50		4 RJ	ND 10	1 RJ	ND 10	ND 5/ND 5	ND 10	ND 5	ND 10
1,1-Dichloroethene	μg/L	NL		ND 0.12	ND 10	ND 0.12	ND 10	ND 0.12/ND 0.12	ND 10	ND 0.12	ND 10
1,1-Dichloroethane	μg/L	NL		ND 0.04	ND 10	ND 0.04	ND 10	ND 0.04/ND 0.04	ND 10	ND 0.04	ND 10
1,2-Dichloroethene(total)	µg/L	5	•	ND 0.1	2j	ND 0.1	ND 5	24]/22]	ND 5	ND 0.1	ND 5
2-Butanone	μg/L	50		ND 10	ND 10	ND 10	ND 10	ND	ND 10	ND 10	ND 10
Chloroform	μg/L	7		ND 0.03	ND 7	ND 0.03	ND 7	ND '	ND 7	ND 0.03	ND 7
1,1,1-Trichloroethane	μg/L	NL		ND 0.08	ND 10	ND 0.08	ND 10	ND 0.08/ND 0.08	ND 10	ND 0.08	ND 10
Carbon tetrachloride	µg/L	NL		ND 0.21	ND 10	ND 0.21	ND 10	ND	ND 10	ND 0.21	ND 10
Bromodichloromethane	μg/L	NL		ND 0.08	ND 10	ND 0.08	ND 10	ND	ND 10	ND 0.08	ND 10
Trichloroethene	µg/L	5.		ND 0.19	ND 5	ND 0.19	ND 5	. 5/5	1j	ND 0.19	ND 5
Benzene	µg/L	0.7		ND 0.04	ND 0.7	ND 0.04	ND 0.7	ND 0.04/ND 0.04	ND 0.7	ND 0.04	ND 0.7
1,1,2-Trichloroethane	μg/L	NL		ND 0.1	ND 10	ND 0.1	ND 10	ND ·	ND 10	ND 0.1	ND 10
4-Methyl-2-pentanone	µg/L	50	•	ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10	ND 10	ND 10
2-Hexanone	μg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10	ND 10	ND 10
Tetrachloroethene	μg/L	· 5		ND 0.14	ND 5	ND 0.14	ND 5	69/64	85	2 R	5
Toluene	μg/L	NL		ND 0.11	ND 10	ND 0.11	ND 10	ND 0.11/ND 0.11	ND 10	ND 0.11	ND 10
Chlorobenzene	μg/L	. 5		ND 0.04	ND 5	ND 0.04	3 J	ND 0.04/ND 0.04	ND 5	ND 0.04	ND 5
Ethylbenzene	μg/L	5		ND 0.06	ND 5	ND 0.06	2 J	ND 0.06/ND 0.06	ND 5	ND 0.06	ND 5
Xylene(total)	μg/L	5 .		1	ND 5	1 J	3]	ND 0.1/ND 0.1	ND 5	ND 0.1	ND 5
Total TICs	μg/L	50 (1)			168		281	-/	ND	·	ND

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER PREDESIGN INVESTIGATION HOOKER/RUCO SITE HICKSVILLE, NEW YORK

			Location ID:	F	-1	F	-2	I-1		1-	-2
		TBC	Collection Date:	01/18/90	12/18/98	01/18/90	12/18/98	01/17/90	12/19/98	01/17/90	12/19/98
Parameters	Units	Criteria	٠.								
TCL Semi-Volatiles				•							
Phenol	μg/L	NL		-	ND 10J	ND 10	ND 10J	ND 10/ND 10	ND 10J	ND 10	ND 10J
4-Methylphenol	µg/L	NL		•	ND 10J	ND 10	ND 10J	ND 10/ND 10	ND 10J	ND 10	ND 101
Naphthalene	µg/L	50		•	ND 10J	ND 10	1j	ND 10/ND 10	ND 10J	ND 10	ND 10J
Diethylphthalate	μg/L	NL	•	•	ND 10J	ND 10	ND 10J	ND 10/ND 10	ND 10J	ND 10	ND 10J
Di-n-butylphthalate	µg/L	50		-	ND 10J	ND 10	ND 10)	ND 10/ND 10	ND 10J	ND 10	ND 10J
bis(2-Ethylhexyl)phthalate	µg/L	50	•	•	ND 10J	2 RJ	ND 10J	2 RJ/5 RJ	ND 10J	6 RJ	ND 10J
Butylbenzylphthalate	µg/L	NL		-	ND 10J	ND 10	ND 10J	ND 10/ND 10	ND 10J	ND 10	ND 10J
Di-n-octylphthalate	µg/L	50	•	ND 10	ND 10J	ŃD 10	ND 10J	ND 10/ND 10	ND 10J	ND 10	ND 10J
	μg/L	50 (1)		520	330	110	936	ND / ND	7	ND	29
PCBs									•	,	
Aroclor-1242	μg/L	NL		ND 0.5		ND 0.5		ND 0.053/ND 0.053	ND 1.0J	ND 0.5	ND 1.0J

Notes:

- (1) Each individual TIC cannot exceed 50 µg/L
- NDx Not detected at or above x
- TCL Target Compound List
- J Reported value is estimated
- R Reported value was rejected
- Not Analyzed
- NL Not Listed in Table 5.2 of Predesign Work Plan For Operable Unit-1, Revision 2, dated January 1999 Exceeds TBC Criteria
- 27/23 Duplicate Analysis

			Location ID:	R-1		A-1	1	D -1	ľ
		TBC	Collection Date:	01/25/90	12/14/98	01/25/90	12/14/98	01/15/90	12/14/98
Parameters	Units	Criteria				•			•
TAL Metals	(total)								
Aluminum	μg/L	NR		140	ND 32.3	690 J	2160	410 J	ND 32.3
Antimony	μg/L	6		ND 34	ND 2.9	ND 34	6.4	ND 20	ND 2.9
Arsenic	μg/L	25		ND 2	ND 2.4	ND 2	ND 2.4	ND 2	ND 2.4
Barium	μg/L	1000		47	34.3	96 .	60.3	41	42.5
Beryllium	μg/L	1		ND 0.2	ND 0.30	1.5 J	0.67	ND 2	ND 0.30
Cadmium	μg/L	5	,	ND 2	ND 0.50	ND 2	ND 0.50	ND 1	ND 0.50
Calcium	μg/L	NR		12000 j	9730	. 17000 J	8380	25000 J	27700
Chromium	μg/L	.50	•	ND 2	3.9	11 R	821	160 J	58.0
Cobalt	μg/L	NR		ND 3	ND 3.6	ND 3	ND 3.6	ND 1	ND 3.6
Copper	μg/L	200	•	ND 3	ND 2.2	16	19.8	ND 0.3	ND 2.2
Iron	μg/L	300 (1)		130 J	55.1	73 R	3740	1300 j	168
Lead	µg/L	15		5 J	ND 1.0	3 J	5.4	3 J	ND 1.0
Magnesium	μg/L	NR		2300	2370	3300	1720	5700 J	7360
Manganese	μg/L	300 (1)		7	4.1	140 J	46.6	53 J	10.0
Nickel	μg/L	NR		ND 6	ND 3.2	11 R	11.8	3	ND 3.2
Potassium	μg/L	NR ·		780	926 j	3800	1800J	3300	3520J
Selenium	μg/L	10		ND 2	ND 1.9	ND 2	ND 1.9	ND 2	ND 1.9
Silver	μg/L	50 '		ND 2 J	ND 0.60	6 j	ND 0.60	1	ND 0.60
Sodium	μg/L	20000	•	4200	5380	54000 J	38600	18000 J	16800
Thallium	μg/L	NL		ND 2	1.2	ND 2	1.3	ND 2	ND 1.2
Vanadium	µg/L	NR		ND 4	ND 1.9	5	3.3	11 R	ND 1.9
Zinc	μg/L	300		ND 6	ND 5.6	10 R	ND 12.1	5 .	ND 7.1
TAL Metals (filtered)			•					
Iron	μg/L	300 ⁽¹⁾	,		ND 16.6		ND 16.6		·
Manganese	μg/L	300 ⁽¹⁾			2.8		20.0	•	

		Location ID:	R	-1	Λ	-1	D	-1
Parameters	Units	Collection Date:	01/25/90	12/14/98	01/25/90	12/14/98	01/15/90	12/14/98
General Che	mistry (total)	•						
Cyanide	mg/L		ND 10		ND 10		ND 10	ND 0.010
BOD5	mg/L			ND 2	4	ND 2		ND 2
COD	mg/L	•		ND 10.0		ND 10.0		ND 10.0
Hardness	mg/L				58			••
TSS	mg/L			37.6	ND 3	56.8		6.8
TDS	mg/L			ND 79	240	184	••	207
TOC	mg/L							1.5

Notes:

NDx Not detected at or above x

TAL Target Analyte List

BOD Biological Oxygen Demand

COD Chemical Oxygen Demand

TSS Total Suspended Solids

TDS Total Dissolved Solids

TOC Total Organic Carbon

- J Reported value is estimated
- R Reported value was rejected
- Not Analyzed

Exceeds TBC Criteria

Mercury was not detected and thus not listed.

- NL Not Listed in Table 5.2 of Predesign Work Plan For Operable Unit-1, Revision 2, dated Jan/99
- NR Not Regulated
- (1) Sum not to exceed 500 µg/L
- (2) Not analyzed for inorganics during RI performed by Northrop

			Location ID:	P-1	t	E-1		E-2	
		TBC	Collection Date:	01/30/90	12/15/98	01/16/90	12/15/98	01/16/90	12/15/98
Parameters	Units	Criteria							
TAL Metals	(total)					• •			
Aluminum	μg/L	NR		33 R	126	22 J	ND 46.1	26 J	ND 86.9
Antimony	μg/L	6		ND 34	ND 2.9	ND 20	ND 2.9	ND 20	ND 2.9
Arsenic	μg/L	25		ND 2	5.7	ND 2	ND 2.4	20 J	24.0
Barium	μg/L	1000		19	53.2	19	52.1	9	9.8
Beryllium	µg/L	1		ND 2	ND 0.30	ND 2	ND 0.30	ND 2	ND 0.30
Cadmium	μg/L	5	•	. 4	ND 0.50	1	ND 0.50	3	ND 0.50
Calcium	μg/L	NR		4600	21200	3200	14600	12000 J	13800
Chromium	μg/L	50	•	ND 2	2.5	ND 1	ND 0.90	ND 1	ND 0.90
Cobalt	μg/L	NR	•	ND 3	ND 3.6	2	ND 3.6	4	ND 3.6
Copper	μg/L	200		ND 2	ND 2.2	ND 0.3	ND 2.2	ND 0.3	ND 2.2
Iron	μg/L	300 (1)		9700 J	14200	9200 J	6170	30000 J	21800
Lead	μg/L	15		3 R	1.5	ND 4 J	ND 1.0	ND 2 J	1.9
Magnesium	μg/L	NR	•	1000	5150	720	3500	1200	3120
Manganese	µg/L	300 (1)		790 J	110	460 J	90.7	83 J	95.2
Nickel	μg/L	NR		ND 6	ND 3.2	ND 2	ND 3.2	3 R	ND 3.2
Potassium	μg/L	NR		880	1250j	1300	1210J	860	993J
Selenium	µg/L	10	•	ND 2	ND 2.5	2 j	ND 1.9	ND 2 J	ND 1.9
Silver	μg/L	50 .	•	ND 2 J	ND 0.60	2 J	ND 0.60	ND 1 J	ND 0.60
Sodium	µg/L	20000		19000 J	4540	17000 J	2760	3300 J	2920
Thallium	μg/L	NL .	•	ND 2	ND 1.2	ND 2	ND 1.2	ND 2	ND 1.2
Vanadium	μg/L	NR		ND 4	ND 1.9	2 R	ND 1.9	ND 1	ND 1.9
Zinc	μg/L	300		ND 2	12.4	16 R	7.2	19 R	ND 5.6
TAL Metals ((filtered)								
Iron	μg/L	300 (1)	•		**				
Manganese	μg/L	300 ⁽¹⁾							

		Location ID:		P-1	. E	-1	E	-2
Parameters	Units	Collection Date:	01/30/90	12/15/98	01/16/90	12/15/98	01/16/90	12/15/98
1 414/1161613	anns							
General Che	mistry (total)					•		
Cyanide	mg/L		ND 10	ND 0.010	ND 10	ND 0.010	ND 10	ND 0.010
BOD5	mg/L			4		ND 4	*-	7
COD	mg/L	• .		34.9		ND 10.0		11.6
Hardness	mg/L			74.2		50.9		47.3
TSS	mg/L	•		32.8		6.4		47.2
TDS	mg/L			ND 124	·· ,	ND 88		ND 87
TOC	mg/L			ND 3.6		ND 2.1		ND 2.3

Notes:

NDx Not detected at or above x

TAL Target Analyte List

BOD Biological Oxygen Demand

COD Chemical Oxygen Demand

TSS Total Suspended Solids

TDS Total Dissolved Solids

TOC Total Organic Carbon

- J Reported value is estimated
- R Reported value was rejected
- -- Not Analyzed

Exceeds TBC Criteria

Mercury was not detected and thus not listed.

- NL Not Listed in Table 5.2 of Predesign Work Plan For Operable Unit-1, Revision 2, dated Jan/99
- NR Not Regulated
- (1) Sum not to exceed 500 µg/L
- (2) Not analyzed for inorganics during RI performed by Northrop

SUMMARY OF DETECTED INORGANICS - GROUNDWATER PREDESIGN INVESTIGATION HOOKER/RUCO SITE HICKSVILLE, NEW YORK

		_	Location ID:	K-1 (G	M-95)	K-2 (G	M-91)	MW-50J1		
		TBC	Collection Date:	02/02/90	12/15/98	02/02/90	12/15/98	01/23/90	12/16/98	
Parameters	Units	Criteria								
TAL Metals	(total)									
Aluminum	μg/L	NR		330	406	440	ND 51.4	260 J	ND 26.9	
Antimony	μg/L	6	•	ND 34	ND 2.9	ND 34	ND 2.9	ND 34	ND 2.9	
Arsenic	μg/L	25		24	24.0	59	54.7	68	83.4	
Barium	μg/L	1000		31	25.9	20	9.6	92	98.6	
Beryllium	µg/L	1		0.66 J	ND 0.30	0.36 J	ND 0.30	ND 2	ND 0.30	
Cadmium	μg/L	5		3	ND 0.50	2	ND 0.50	ND 2	ND 0.50	
Calcium	μg/L	NR		15000	6070	11000	3890	33000 J	15800	
Chromium	µg/L	50	•	2	ND 0.90	4 .	ND 0.90	2	ND 0.90	
Cobalt	μg/L	NR	•-	6	ND 3.6	3	ND 3.6	17 ·	ND 3.6	
Copper	μg/L	200		13	4.9	8.2	ND 2.2	4.6	ND 2.2	
iron	μg/L	300 (1)	•	55000	46000	23000	57800	75000 J	118000	
Lead	µg/L	15		3 J	2.6	2]	3.8	2 J	5.2	
Magnesium	μg/L	NR .		1800	2030	1400	1290	1700	5610	
Manganese	µg/L	300 (1)	•	230	174	120	116 .	420 J	430	
Nickel	μg/L	NR	•	ND 6	ND 3.2	, 7	ND 3.2	23	ND 3.2	
Potassium	μg/L	NR		890	1030J	12000	931 J	1400	3160J	
Selenium	μg/L	10		ND 20	ND 1.9	ND 2	ND 2.9	ND 20	ND 1.9	
Silver	μg/L	50		ND 2 J	2.6	ND 2 J	3.3	ND 2 J	5.8	
Sodium	μg/L	20000	•	1200	2420	23000	10200	8400 J	5000	
Thallium	μg/L	NL	•	ND 2	ND 1.2	ND 2	ND 1.2	ND 2	ND 1.2	
Vanadium	μg/L	NR .		ND 4	ND 1.9	ND 4	ND 1.9	ND 4	ND 1.9	
Zinc	μg/L	300		. 3	ND 5.6	10	ND 5.6	19 J	ND 5.6	
TAL Metals (filtered)		•							
Iron	μg/L	300 (1)							106000	
Manganese	μg/L	300 (1)	•		·		·	·	407	

SUMMARY OF DETECTED INORGANICS - GROUNDWATER PREDESIGN INVESTIGATION HOOKER/RUCO SITE HICKSVILLE, NEW YORK

	Location ID:	K-1 (G	M-9S)	K-2 (GM-91)		MW-50J1		
		Collection Date:	02/02/90	12/15/98	02/02/90	12/15/98	01/23/90	12/16/98
Parameters	Units						•	•
General Che	mistry (total)			•				•
Cyanide	mg/L		ND 10 J	ND 0.010	ND 10 J	ND 0.010	ND 10	ND 0.010
BOD5	mg/L		8/18	9	7/17	6		26
COD	mg/L		41	. 11.3	. 35	13.9		66.5
Hardness	mg/L		46	23.5	36	15.0	* -	62.6
TSS	mg/L	•	70	38.4	56	110.4		81
TDS	mg/L		150	ND 98	170	ND 83		190
TOC	mg/L		7	ND 2.0	, 8	ND 3.1	 '	13.9

Notes:

NDx Not detected at or above x

TAL Target Analyte List

BOD Biological Oxygen Demand

COD Chemical Oxygen Demand

TSS Total Suspended Solids

TDS Total Dissolved Solids

TOC Total Organic Carbon

- J Reported value is estimated
- R Reported value was rejected
- Not Analyzed
 Exceeds TBC Criteria

Mercury was not detected and thus not listed.

- NL Not Listed in Table 5.2 of Predesign Work Plan For Operable Unit-1, Revision 2, dated Jan/99
- NR Not Regulated
- (1) Sum not to exceed 500 µg/L
- (2) Not analyzed for inorganics during RI performed by Northrop

SUMMARY OF DETECTED INORGANICS - GROUNDWATER PREDESIGN INVESTIGATION HOOKER/RUCO SITE HICKSVILLE, NEW YORK

			Location ID:	MV	V-50 J 2	MW-50D2	Composite-1	MW-52I	MW-52S
		TBC	Collection Date:	01/18/90	12/16/98	12/16/98	12/16/98	12/17/98	12/17/98
Parameters	Units	Criteria							
TAL Metals (total)						•		
Aluminum	μg/L	NR		370	ND 21.1/90.3	782	ND 48.2J	ND 40.1J	543J
Antimony	μg/L	6		ND 20.0	ND 2.9/ND 2.9	ND 2.9	ND 2.9	ND 2.9	ND 2.9
Arsenic	µg/L	25		. 43 J	48.7/49.0	3.1	61.6	ND 2.4	ND 2.4
Barium	μg/L	1000		14.0	11.2/11.4	22.2	46.7	ND 13.9	28.3
Beryllium	μg/L	1		ND 2.0	ND 0.30/ND 0.30	ND 0.30	ND 0.30	ND 0.30	ND 0.30
Cadmium	μg/L	5	\	- 1	ND 0.50/ND 0.50	ND 0.50	ND 0.50	ND 0.50	ND 0.50
Calcium	μg/L	NR		29000 J	11200/11300	66800	14000	5070	19100
Chromium	μg/L	. 50	•	ND 1.0	1.6/1.4	9.6	ND 0.90	ND 0.90	ND 0.90
Cobalt	μg/L	NR		3.0	ND 3.6/ND 3.6	ND 3.6	ND 3.6	ND 3.6	ND 3.6
Copper	μg/L	200		ND 0.3 ,	ND 2.2/ND 2.2	ND 2.2	ND 2.2	ND 2.2	18.3
Iron	μg/L	300 (1)		12000 j	32100/32300	ND 48.3	725001	ND 40.3J	1630)
Lead	µg/L	15		2 J	4.2/4.0	ND 1.0	ND 4.6	ND 1.0	8.7
Magnesium	μg/L	NR	•	3200	2290/2310	ND 76.3	3810	1560	3070
Manganese	μg/L	300 (1)		170 J	314/315	1.0	390	7.8	402
Nickel	μg/L	NR		15 R	ND 3.2/ND 3.2	ND 3.2	ND 3.2	ND 3.2	5.4
Potassium	μg/L	NR		9600 J	1370]/1380]	1480)	2080	1110	3300
Selenium	μg/L	10		ND 2 J	ND 1.9/ND 1.9	ND 1.9	3.0	ND 1.9	ND 1.9
Silver	μg/L	50	•	ND 1 J	1.7/ND 1.7	ND 0.60	5.3	ND 0.60	ND 0.60
Sodium	μg/L	20000		25000 J	17500/17700	6830	11500	18400	19400
Thallium	µg/L	NL		ND 2	1.2/1.8	ND 1.2	ND 1.3	ND 1.5	ND 1.2
Vanadium	μg/L	NR		3 R	ND 1.9/ND 1.9	14.9	ND 1.9	ND 1.9	ND 1.9
Zinc	µg/L	300		52 J	ND 5.6/ND 6.1	ND 5.6	ND 6.3	ND 8.0	194
TAL Metals (filtered)								
Iron	μg/L	300 ⁽¹⁾		·	30700/32200			ND 16.6	452
Manganese	μg/L	300 (1)			316/331			7.7	374

•		Location ID:	٨	1W-50J2	MW-50D2	Composite-1	MW-52I	MW-52S
		Collection Date:	01/18/90	12/16/98	12/16/98	12/16/98	12/17/98	12/17/98
. Parameters	Units			•				
General Che	mistry (total)							
Cyanide	mg/L		ND 10	ND 0.010/ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010
BOD5	mg/L			3/3	ND 2	9	ND 2	ND 2
COD	mg/L			ND 10.0/11.3	ND 10.0	ND 24.4	ND 10.0	ND 21.8
Hardness	mg/L			37.4/37.6	167	50.7	133	60.4
TSS	mg/L	•		66.4/63.6	6	151	ND 4	169
TDS	mg/L			115/ND 110	216	121	ND 92	133
TOC .	mg/L			ND 1.5/ND 1.4 '	ND 1.1	ND 5.5	ND 1.1	ND 1.4

Notes:

NDx Not detected at or above x

TAL Target Analyte List

BOD Biological Oxygen Demand

COD Chemical Oxygen Demand

TSS Total Suspended Solids

TDS Total Dissolved Solids

TOC Total Organic Carbon

- J Reported value is estimated
- R Reported value was rejected
- Not Analyzed

Exceeds TBC Criteria

Mercury was not detected and thus not listed.

- NL. Not Listed in Table 5.2 of Predesign Work Plan For Operable Unit-1, Revision 2, dated Jan/99
- NR Not Regulated
- (1) Sum not to exceed 500 µg/L
- (2) Not analyzed for inorganics during RI performed by Northrop

							•		•	
			Location ID:	MW-52D	GM-10I (2)	Composite-2	F-:	1	F-	2
		ТВС	Collection Date:	12/17/98	12/17/98	12/16/98	01/18/90	12/18/98	01/18/90	12/18/98
Parameters	Units	Criteria					,			
TAL Metals ((total)								•	
Aluminum	μg/L	. NR		ND 86.1J	ND 51.6J	300J	14 R	ND 15.1J	94	ND 21.7J
Antimony	μg/L	6		ND 2.9	ND 2.9	ND 2.9	22	ND 2.9	66 J	ND 2.9
Arsenic	μg/L	25		ND 2.4	ND 2.4	ND 2.4	45 J	32.1	40 J	75.4
Barium	μg/L	1000	•	30.5	29.3	21.6	57	34.6	16	18.1
Beryllium	μg/L	1	• •	ND 0.30	ND 0.30	ND 0.30	ND 2	ND 0.30	ND 2	ND 0.30
Cadmium	μg/L	5	and the second second	ND 0.50	ND 0.50	ND 0.50	ND 1	ND 0.50	3	ND 0.50
Calcium	μg/L	NR .		19800	4410	12000	14000 J	13200	7500 J	7300
Chromium	μg/L	50 .	•	ND 0.90	ND 0.90	ND 0.90	1	ND 0.90	ND 1	ND 0.90
Cobalt	μg/L	NR		ND 3.6	5.7	ND 3.6	8	ND 3.6	4	ND 3.6
Copper	μg/L	200		ND 2.2	5.4	5.4	2.1	ND 2.2	0.3	ND 2.2
Iron	μg/L	300 (1)	•	299J	ND 16.6J	726J	84000 J	68600J	72000 J	101000J
Lead	μg/L	15		ND 1.6	ND 1.0	4.1	ND 2 J	3.7	ND 4 J	5.8
Magnesium	μg/L	NR		6420	1640	2460	29000	3000	1700	2390
Manganese	μg/L	300 (1)		11.1	214	219	120 J	156	970 J	255
Nickel	μg/L	NR	ζ	7.2	ND 3.2	ND 3.2	19 R	ND 3.2	16 R	ND 3.2
Potassium	μg/L	NR		1970	63000	2090	1800	1250	1400	1610
Selenium	μg/L	10		5.4	ND 1.9	ND 1.9	ND 2 J	ND 1.9	ND 20 J	ND 1.9
Silver	μg/L	50		ND 0.60	ND 0.60	ND 0.60	ND 1 J	3.2	ND 1 J	4.7
Sodium	μg/L	20000		20100	47900	19800	4900 J	12100	7300 J	9960
Thallium	μg/L	NL .		ND 1.2	ND 1.5	ND 1.2	ND 2	ND 1.2	ND 2	ND 1.2
Vanadium	μg/L	NR		ND 1.9	ND 1.9	ND 1.9	ND 1	ND 1.9	ND 1	ND 1.9
Zinc	μg/L	300		ND 17.3	ND 9.3	87.6	33 R	ND 5.6	18 R	ND 5.6
TAL Metals (filtered)	•								
Iron	μg/L	300 ⁽¹⁾	•		ND 16.6			·		
Manganese	μg/L	300 ⁽¹⁾			172		. 			

		Location ID:			Composite-2 F-1			F-2		
	•	Collection Date:	12/17/98	12/17/98	12/16/98	01/18/90	12/18/98	01/18/90	12/18/98	
Parameters	Units									
General Che	mistry (total)									
Cyanide	mg/L		ND 0.010	ND 0.010	ND 0.010	ND 10	ND 0.010	ND 10	ND 0.010	
BOD5	mg/L		ND 2	ND 2	2 .		3		. 2	
COD	mg/L		ND 10.0	ND 10.0	10.0	,	16.5		29.7	
Hardness	mg/L		75.9	17.7	40.0	•	45.4		27.9	
TSS .	mg/L		46.0	ND 4	35.2		8		38.4	
TDS .	mg/L		191	270	118		193	••	138	
TOC ·	mg/L		ND 1.3	ND 1.1	ND 1.2		ND 2.8		ND 4.8	

Notes:

NDx Not detected at or above x

TAL Target Analyte List

BOD Biological Oxygen Demand

COD Chemical Oxygen Demand

TSS Total Suspended Solids

TDS Total Dissolved Solids

TOC Total Organic Carbon

- J Reported value is estimated
- R Reported value was rejected
- -- Not Analyzed

Exceeds TBC Criteria

Mercury was not detected and thus not listed.

- NL Not Listed in Table 5.2 of Predesign Work Plan For Operable Unit-1, Revision 2, dated Jan/99
- NR Not Regulated
- (1) Sum not to exceed 500 µg/L
- (2) Not analyzed for inorganics during RI performed by Northrop

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SUMMARY OF DETECTED INORGANICS - GROUNDWATER PREDESIGN INVESTIGATION HOOKER/RUCO SITE HICKSVILLE, NEW YORK

			Location ID:	MW-50D1	1-1	,	1-2	
		TBC	Collection Date:	12/18/98	01/17/90	12/19/98	01/17/90	12/19/98
Parameters	Units	Criteria						
TAL Metals (total)							•
Aluminum	μg/L	NR		929J	230/200	ND 11.5J	200 J	120J
Antimony	μg/L	6		ND 2.9	ND 20/ND 20	ND 2.9	ND 20	ND 2.9
Arsenic	μg/L	25	•	6.2	5/6	ND 2.4	2	5.7
Barium	µg/L	1000		ND 17.6	140/140	114	17	19.9
Beryllium	μg/L	1		ND 0.30	ND 2/ND 2	ND 0.30	ND 2	ND 0.30
Cadmium	μg/L	5		ND 0.50	1/ND 1	ND 0.50	ND 1	0.69
Calcium	μg/L	NR		37100	38000j/38000j	29200	15000 J	14600
Chromium	µg/L	50	•	3.3	ND 1/ND 1	ND 0.90	ND 1	3.2
Cobalt	μg/L	NR	•	ND 3.6	49/46	ND 3.6	ND 1	3.9
Copper	μg/L	200		7.2	ND 0.3/ND 0.3	ND 2.2	5.4	3.2
Iron	μg/L	300 (1)		1370J	5100J/5100J	38.7]	2700 J	14000]
Lead	μg/L	15		4.1	ND 2J/ND 2J	ND 1.0	3 J	2.8
Magnesium	µg/L	NR	•	3120	4500/4600	5060	2900	4200
Manganese	µg/L	300 (1)		38.1	470J/460J	159	680 J	1230
Nickel	μg/L	NR	-,	5.1	23R/11R	5.7	· 14 R	37.8
Potassium	μg/L	NR		ND 1110	3000/2900	2500	2400	2430
Selenium	μg/L	- 10		ND 1.9	ND 2J/ND 2J	2.4	ND 2 J	ND 1.9
Silver	μg/L	50		ND 0.60	ND 1J/ND 3J	ND 0.60	3 j	ND 0.60
Sodium	μg/L	20000		16000	21000J/21000J	11700	20000 J	12900
Thallium	μg/L	NL		ND 1.2	ND 2/ND 2	ND 1.2	ND 2	ND 1.2
Vanadium	μg/L	NR		13.5	ND 1/ND 1	ND 1.9	ND 1	ND 1.9
Zinc	μg/L	300		12.6	78R/78R	8.6	23 R	6.1
TAL Metals (filtered)							
Iron	μg/L	300 (1)		ND 16.6			:-	13900
Manganese	μg/L	300 ^(t)		4.6				1240

		Location ID:	MW-50D1	1-1		I	-2
•		Collection Date:	12/18/98	01/17/90	12/19/98	01/17/90	12/19/98
Parameters	Units	,			•		
General Che	mistry (total)						•
Cyanide	mg/L	•	ND 0.010	ND 10/ND 10	ND 0.010	ND 10	ND 0.010
BOD5	mg/L		ND 2	· · ·	4		· 2
COD	mg/L		11.3		ND 10.0	*	ND 10.0
Hardness	mg/L		104	•	91.8		53.6
TSS	mg/L		418		4.4		42
TDS	mg/L		187		146		121
TOC	mg/L	•	ND 1.1	 ,	ND 1.8		ND 1.0

Notes:

NDx Not detected at or above x

TAL Target Analyte List

BOD Biological Oxygen Demand

COD Chemical Oxygen Demand

TSS Total Suspended Solids

TDS Total Dissolved Solids

TOC Total Organic Carbon

- J Reported value is estimated
- R Reported value was rejected
- -- Not Analyzed

Exceeds TBC Criteria

Mercury was not detected and thus not listed.

- NL Not Listed in Table 5.2 of Predesign Work Plan For Operable Unit-1, Revision 2, dated Jan/99
- NR Not Regulated
- (1) Sum not to exceed 500 µg/L
- (2) Not analyzed for inorganics during RI performed by Northrop

TABLE 10

SUMMARY OF REDOX PARAMETERS PREDESIGN INVESTIGATION HOOKER/RUCO SITE HICKSVILLE, NEW YORK

	Location ID: Sample ID: Collection Date:	R-1 DJT-001 12/14/98	Λ-1 DJT-002 12/14/98	MW50J1 DJT-011 12/16/98	MW50J2 DJT-012 12/16/98	MW50J2 DJT-013 12/16/98	MW52I DJT-017 12/17/98	MW52S DJT-018 12/17/98	GM-101 DJT-020 12/17/98
Parameters	Units	12/14/30	141430	121030	1210/30	Duplicate	1417/36	141//38	1411/30
T. Organic Carbon (TOC)	mg/L	-		13.9	ND 1.5	ND 1.4	ND 1.1	ND 1.4	ND 1.1
Dissolved Oxygen (DO)	mg/L	10.46	11.82	5.94	1.62	•	2.82	0.71	5.16
ORP	· mV	225	241	-38	-63	• -	133	80	1.9
Nitrate-Nitrite (As N)	mg/L	1.1	2.3	ND 0.24	ND 0.11	ND 0.15	1.2 .	ND 0.10	4.9
Nitrite (As N)	mg/L	ND 0.05)	ND 0.05	0.12	ND 0.05	0.05	ND 0.05	ND 0.05	ND 0.05
Ammonia (As N)	mg/L	0.14	ND 0.05	2.1	1.3	1.1	ND 0.12	0.48	0.49
Manganese (dissolved-lab)	mg/L	0.003	0.020	0.407	0.316	0.331	0.008	0.374	0.172
Iron (dissolved-lab)	mg/L	ND 0.0166	ND 0.0166	106	30.7	32.2	ND 0.0166	0.452	ND 0.0166
Iron (dissolved-field)	mg/L	0.26	0.04	5.2	5.45	-	0.05	0.47	NA
Sulfate	mg/L	27.9	43.1	ND 1.0	17.3	17.1	24.3 ,	24.3	14.2
Sulfide	mg/L	ND 0.5	ND 0.5	ND 0.5	ND 0.5	ND 0.5	ND 0.5	ND 0.5	ND 0.5
Methane	mg/L	ND 0.001	ND 0.001	13	0.430J	0.120J	0.016	0.42	ND 0.0019
Ethane	mg/L	ND 0.001	ND 0.001	0.51	0.0039	0.0016	ND 0.0005	0.0038	ND 0.0005
Ethene	mg/L	ND 0.001	ND 0.001	0.0017	0.055J	0.026J	0.65	0.81	0.0016

Notes:

Not Applicable.

J Estimated.

NDx Not detected at or above x.

TAL Target Analyte List.

TCL Target Compound List.

MODKER CHEMICAL/RUCO POLYMER SITE SUPPRARY OF CHEMICAL COMPOUNDS (DETECTS + UNDETECTS/2) GROUNDWATER

COMPOUND	VALID	OCCUR	UN DETECT	EST	RE JEC	FREQ T DETECT	MINIMUM DETECTED CONCENTRATION	SAMPLE 1D	MAXIMAN DETECTED CONCENTRATION	SAMPLE 10	MEDIAN CONCENTRATION	GEOMETRIC MEAN	MEAN CONCENTRATION	LOWER	UPPER	SIMORD. DEV.	95% C† UPPER LIMET
[] Low Detection Limit Volut	tile (LO	L VOA) Ug/	Ł									ě	•			•
(Halogenated Volatiles)							•										
Chlorobenzenė	36	3	33	0	•	0.06	2.000	E1	6.000	P1	0.020	0.027	0.241	0.020	0.020	3.335	0.100
Chi orome thane	36	3	33	1	•	0.08	9.000	W 1059 3	10,000	HI- D	0.065	0.086	0.589	0.065	0.065	3.183	0.290
Tetrachtoroethena .	34	14	50	6	1	0.41	0.800	52	98.000	DI	0.070	0.507	11.979	0.070	5.000	15.382	275.570 x
trans-1,2-Dichloroethene	36	16	20	13	•	0.44	1,000	92	54.000	D1	0.050	0.358	4.863	0.050	3.000	12.117	55.590 x
frichtorochtene	36	11	25	1	•	0.31	2.000	cs	18.000	D1	0.095	0.297	2.096	0.095	2.000	6,694	6.150
Vinyl Chloride	36	8	28	3	•	0.22	7.000	D2	560.000	N 1059 3	0.085	0.278	22.180	0.085	0.085	12.565	68.530
•					TOTAL		21.800		746,000				•				
(Non-Halogenated Volatiles	,						*										-
2-Butanone	36	2	34	1	•	0.06	3.000	15	3.000	15	5.000	4.930	4.944	5.000	5.000	1.089	5.070 x
4-Methyl-2-Pentanone	36	4	32	2	•	0.11	11.000	J1	320.000	P1	5.000	5.953	14.306	5,000	5.000	2.073	10.190
Acetone	35	35	. 0	0	1	1.00	10.000	A1	10.000	52	10.000	10.000	10,000	10.000	10.000	1.000	10.000
Benzene	36	2	34	0	•	0.06	10.000	N 1059 3	10.000	N 1059 3	0.020	0.024	0.297	0.020	0.020	2.817	0.070
Cerbon Disulfide .	33	6	27	4	3	0.18	1.000	02	4.000	F1	2.500	2.367	2.455	2.500	2.500	1.349	2.720
Ethylbenzene	36	4	32	1		0.11	3.000	E1	8,000	PI	0.030	0.046	0.528	0.030	0.030	4.337	0.290
Hylene (total)	36	7	29	3	. (0.19	1.000	F1	15,000	PT	0.050	0.100	0.903	0.050	0.050	5.088	0.970
			•		TOTAL	****	39.000		370.000			,					•

MOTE: (X), IN 95% CT COLUMN, INDICATES VALUE IS GREATER INAN MAXIMUM CONCENTRATION; (*), ASTERISKS, INDICATE THAT THE NUMBER OF OCCURRENCES IS TOO SMALL TO ALLOW CALCULATION

MOOKER CHEMICAL/RUCO POLYMER SITE SUPMARY OF CHEMICAL COMPOUNDS (DETECTS + UMDETECTS/2) GROUNDMATER

ССФРОЦИЮ	VALID OC		UNI- DETECT	ES1 A	RE JECT	FREQ DETECT	MINIMUM DETECTED CONCENTRATION	SAMPLE 1D	MAXIMIM DETECTED CONCENTRATION	SAMPLE ID	MEDIAN CONCENTRATION	GEOMETRIC MEAN	MEAN CONCENTRATION	=	UPPER QUARTILE	SINDRD. DEV.	95% CI UPPER LINIT
[] Base Heutral Acid (BHA)	ug/L						•										•
(Polycyclic Aromatic Hydroca	rbons)																
MAPHINALENE	34	1	33	1	0	0.03	2.000	E1	2.000	El	5.000	4.867	4.912	5.000	5.000	1.170	5,168 X
				1	OTAL	****>	2.000		2.000								
(Phthalate Esters)									•	•							
BIST2-ETHYLHERYLJPHTHALATE	29	16	13	16	5	0.55	1.000	NI O	6.000	12	5,000	3,557	3.897	2.000	5.000	1.603	4.747
DI-n-BUTYLPHTHALATE	34	1	33	0	0	0.03	45.000	PI	45.000	P1	5,000	5.334	6.176	5.000	51,000 5,000	1.458	6.468
DI-N-OCIVE PHIMALATE	34	1	33	. 1	0	0.03	2.000	D1	2.000	DI	5.000	4.867	4.912	5,000	5.000	1.170	5,168 X
				. 1	IOTAL	****	48.000		53.000		•		-				
[] Pesticide/Polychlorinated (Biphenyl	(PE	ST/PCB) ug	9 /L												
(Pesticides)		٠.													:		
DIELDRIN	35	1	34	1	0	0.03	0.004	6 5	0.004	G2	0,050	0.050	0.062	0.050	0.050	1.799	0.073 x
HEPTACHLOR EPOXIDE	35	5	33	5	0	0.06	0.003	65	0.015	L1	0.025	0.025	0.031	0.025	0.025	1.724	0.035 x
				•	1	*****	0.007		0.019			• .					
[] Inorganic (INORG) ug/L							•							,			
ALEMINUM	31	31	0	20	4	1.00	12.000	A2	1200,000	52	230.000	198,558	345 . 194	160.000	380.000	3.446	791,917
ANT EMONY	35	3	32	1	0	0.09	22.000		66.000		17.000	15.363	17.286	10.000	17.000	1.543	19.478
ARSENIC		13	55	7	0	0.37	2,000		68.000	11	1.000	2.999	11.314	1,000	8.000	4.882	26.844

MOTE: (M), IN 95% CT COLUMN, ENDICATES VALUE IS GREATER THAN MAXIMUM CONCENTRATION; (*), ASTERISKS, INDICATE THAT THE NUMBER OF OCCURRENCES IS TOO SMALL TO ALLOW CALCULATION

MODKER CHEMICAL/RUCO POLYMER SITE SUMMARY OF CHEMICAL COMPOUNDS (DETECTS + UMDETECTS/2) GROUNDWATER

COMPOUND	VAL I	oca		M- ETECT	EST :	REJEC	FREO F DETECT	MINIMUM DETECTED CONCENTRATION	SAMPL	E ID	MAXIM.M DETECTED CONCENTRATION	SAMPLE	i ID	MEDIAN CONCENTRATION	GEOMETRIC MEAN	MEAN CONCENTRATION	LOWER QUARTILE	UPPER QUARTILE	STHORD. DEV.	95% CI UPPER LIMIT
BARIUM	35	39	 5	0		0	1.00	8.000	52		140.000	11 0	>	39.000%	36.233	51.314	19.000	74.000	2.402	75.258
BERYLLIUM	35			27	0	0	0.23	0.210	62		2.000	A1		1.000	0.611	0.799	0.585	1,000	2.480	1.346
CADMIUM	35	14	6	21	1	0	0.40	1,000	50		130.000	C1		1.000	1.329	5.129	1.000	1.500	2.789	3.640
CALCIUM	35	39	5	0	29	0	1.00	2400.000	AZ		150000.000	ST [,	15000.000	14381.603	23140.000	8650.000	21000.000	2.465	31423.703
CHROPILIN	30	17	7	13	2	5	0.57	1,000	F1		160.000	Dŧ		2.000	1.788	8.383	0.500	4.000	4.066	11.326
COBALT	35	- 11	9	16	1	0	0.54	2.000	E1		49.000	11		3.000	3.025	7.143	1.500	6.000	3.631	13.720
COPPER	33	17	7	16	Z	2	0.52	0.340	- F2		16.000	AT		2.000	1,123	3.230	0.150	4.300	5.253	12.181
IRON	34	34	4	0	26	1	1.00	49.000	#1	D	84000.000	F1		3900.000	2206.835	15496,971	370,000	23000.000	11.469	303657.356 X
LEAD	31	13	3	18	13	4	0.42	2.000	DZ		44.000	N 105	9 3	1.000	1.790	3.290	1.000	3,000	2.300	3.596
MAGNESIUM	35	39	5	0	4	0	1.00	360.000	51	0	6400.000	GT		2600.000	1977.031	2457.429	1250.000	3150.000	2.076	3401.812
MANGANESE	31	3	3	0	25	. 5	1.00	4.000	81		1700,000	N 105	93	120.000	88.625	276.121	23.000	460.000	5.990	1469.572
HERCURY	35	,	1	34	0	0	0.03	0.200	81		0.200	01		0.100	0.102	0.103	0.100	0.100	1.124	0.106
MICKEL	22	? :	7	15	1	13	0.32	· 3.000	01		150.000	M2		3.000	4.079	11.318	3,000	7.000	2.999	15.020
POTASSIUM	34	3	4	0	5	1	1.00	660.000	A2		22000.000	\$2		1600.000	2074.450	3169.706	1100.000	3600.000	2.294	4089.514
SELENTUM	39	,	1	34	1	0	0.03	4.000	LI		4.000	LI		1.000	1.354	2.114	1,000	1.000	2.150	2.422
SILVER	. 3	3	7	26	6	2	0.21	1.000	01		6.000	AT		1.000	0.954	1.182	0.500	1,000	1.812	1.406
\$001UM	39	3	5	0	30	0	1.00	1200.000	K1		54000.000	AT		17000,000	11648.655	15551.429	6200,000	20500.000	2.338	23383.772
VAHADIUM	20) (6	22	2	7	0.21	4.000	MT 1	0	16.000	S2		2.000	1.720	2.679	0.500	2.000	2.567	4,270
SINC -	2	1	1	11	6	13	0.50	3.000	KT		100.000	L1		4.000	5.209	13.273	3,000	10.000	3.663	30.911
	٠					TOTAL	****	4738.750			320251.200									

PARAMETERS AND ASSUMPTIONS TO CALCULATE GROUND WATER EXPOSURE PATHWAYS FUTURE USE SCENARIO HOOKER/RUCO SITE

Receptor: Residents-Adults

Exposure Route	Ingestion	Dermal Contact	Inhalation
Exposure Frequency days/year	350	350	350
Exposure Duration years/life time	30	30	30
Body Weight kg	70	70	70
Bioavailability Factor	1	• •	1
Ingestion Rate L/day	2	•	. •
Skin Surface Area	•	20000	•
Exposure Time hours/day	-	0.25	0.33
Inhalation Rate M3/Hr	•	•	1.4

Parameters for Shower

Shower Frequency=1/day
Shower Room Vol.(m^3)=12.0
Droplet Diam.(mm)=1.0
Shower Water Flow Rate (Vmin.)=10.0
Bathroom Air Exchange Rate (exch/hr)=1.0

Shower Water Temperature (C)=45.0 Droplet Drop Time (sec.)=2.000 Shower Duration (min.) =15.0 Time in Room After Shower (min.) =5.0 Viscosity of Shower Water (cp) = 0.601

PARAMETERS AND ASSUMPTIONS TO CALCULATE GROUND WATER EXPOSURE PATHWAYS FUTURE USE SCENARIO HOOKER/RUCO SITE

Receptor: Residents-Children

Exposure Route	Ingestion	Dermal Contact	Inhalation
Exposure Frequency days/year	350	350	350
Exposure Duration years/life time	· · · · · · · · · · · · · · · · · · ·	6	6
Body Weight	35	35	35
Bioavailability Factor	1	•	1
Ingestion Rate L/day	2	÷.	•
Skin Surface Area cm2	•	12000	÷
Exposure Time hours/day	•	0.25	0.33
Inhalation Rate M3/Hr	•	•	1.5

Parameters for Shower

Shower Frequency=1/day
Shower Room Vol.(m^3)=12.0
Droplet Diam.(mm)=1.0
Shower Water Flow Rate (l/min.)=10.0
Bathroom Air Exchange Rate (exch/hr)=1.0

Shower Water Temperature (C)=45.0 Droplet Drop Time (sec.)=2.000 Shower Duration (min.) =15.0 Time in Room After Shower (min.) =5.0 Viscosity of Shower Water (cp) = 0.601

HOOKER/RUCO SITE TOXICITY DATA FOR NONCARCINOGENIC AND POTENTIAL CARCINOGENIC EFFECTS DOSE RESPONSE EVALUATION

	Noncaronogan	Reference Dose	Subchronic Noncerdn	ogen Reference Dose	erg beer in w	Carcinoger	Slope Factor	· A. · · · · · · · · · · · · · · · · · ·	Haire Maine Levil
Chemical Name	RfD(oral)	RfD(inhalation)	RfD (oral sub)	RfD(Inhalation, sub)	Oral SF	Weight	Inhalation SF		Compounds
	(mg/kg-day) 👯 🎚	(mg/Kg-day)	(mg/Kg-day)	(mg/Kg-day)	(mg/Kg-day)-	1 (1966)	(mg/Kg-day)- i	· 學數 医鼠	w/o Criteria
Volatiles:			•						
1,1,1-Trichloroethane	9.00E-02	3.00E-01	9.00E-01	3.00E+00	NA	D	NA	D	
1,1,2,2-Tetrachloroethane	NA NA	NA	NA	NA	2.00E-01	С	2.00E-01	С	
1,1-Dichloroethene	9.00E-03	ND	9.00E-03	ND	6.00E-01	C	1.20E+00	C	
2-Butanone	5.00E-02	9.00E-02	5.00E-01	9.00E-01	NA	Ð	NA	D	
4-Methyl-2-pentanone	5.00E-02	2.00E-02	NA	NA	NA	NA	NA	NA	
Acetone	1.00E-01	NA	1.00E+00	NA	NA	D	NA	D	
Benzene	, NA	NA	NA	NA	2.90E-02	Α	2.90E-02	Α	
Bromodichloromethane	. 2.00E-02	, ND	2.00E-02	ND ·	1.30E-01	B2	ND	B2	
Carbon Disulfide	1.00E-01	2.90E-03	1.00E-01	2.90E-03	NA	NA	NA	NA	
Carbon Tetrachloride	7.00E-04	ND	7.00E-03	ND	1.30E-01	B2	1.30E-01	B2	•
Chlorobenzene	2.00E-02	5.00E-03	2.00E-01	5.00E-02	NA	D	· NA	D	
Chloroform	1.00E-02	NA	1.00E+00	NA ,	6.10E-03	B2	8.10E-02	B2	
Chloromethane	NA ,	NA .	NA	NA	1.30E-02	С	6.30E-03	С	
Ethylbenzene	1.00E-01	2.90E-01	1.00E+00	2.90E-01	NA	D	NA	D	
Styrene	2.00E-01	· ND	2.00E+00	ND	3.00E-02	B2	2.00E-03	B2	
Tetrachloroethene	1.00E-02	NA	1.00E-01	NA	5.10E-02	B 2	1.80E-03	B2	
Toluene	2.00E-01	5.70E-01	2.00E+00	2.70E-01	NA	D	NA ·	D	
Total Xylenes	2.00E+00	8.60E-02	4.00E+00	8.60E-02	NA	D	NA	D	
Trans-1,2-Dichloroethene	2.00E-02	ND	2.00E-01	ND	' NA	NA	NA	NA	
Trichloroethene	NA .	. NA	, NA	NA	1.10E-02	B2	1.70E-02	B2	
Vinyi Chloride	NA ·	NA	NA	NA	1.90E+00	A	2.90E-01	Α	

EPA Weight of Evidence Classifications are as follows:

Group A:- Human Carcinogen. Sufficient evidence from epidemiologic studies to support a causal association between exposure and cancer.

Group B1;- Probable Human Carcinogen. Limited evidence of carcinogenicity in human from epidemiological studies.

Group B2: Probable Human Carcinogen. Sufficient evidence of carcinogenicity in animals. Inadequate evidence of carcinogenicity in humans.

Group C:- Possible Human Carcinogen. Limited evidence of carcinogenicity in animals.

Group D:- Not Classified. Inadequate evidence of carcinogenicity in animals.

All toxicity Values unless otherwise noted are from Integrated Risk Information System (IRIS) June 1992 sessions,

and from Health Effects Assessment Summary Tables (HEAST)-1990 4th Quarter (USEPA, 1990).

NA :Not Available

ND : Not Determined

Note:

HOOKER/RUCO SITE **TOXICITY DATA FOR NONCARCINOGENIC** AND POTENTIAL CARCINOGENIC EFFECTS **DOSE RESPONSE EVALUATION**

		Reference Dose	Subahrania None	archogen Reference Dose	i jednik te i me	ardnogen :	Slope Factor	yra i Myr	PARAMER SO
Chemical Name	RfD(oral) (mg/Kg-day)	RfD(Inhalation)	RfD (oral sub) (mg/Kg-day)	RfD(inhalation, sub) (mg/Kg-day)	Oral SF (mg/Kg-day)-1	Welght	Inhalation SF (mg/Kg-day)-1	Weight	Compounds w/o Criteria
Semi-Volatiles;	•								
Benzoic Acid	4.00E+00	NA ·	4.00E+00	NA	, NA	D	NA	D	2-Methylnaphthalene
Bis(2-ethylhexyl)phthalate	2.00E-02	ND .	2.00E-02	NA	1.40E-02	B2	ND	B2	Benzo (g,h,l) perylene
Butyl benzyl phthalate	2.00E-01	NA	2.00E+00	NA NA	NA	C	NA	С	4-Methylphenol
DI-n-butyl phthalate	1.00E-01	NA ·	1.00E+00	NA	NA	D	NA	D	Phenanthrene
Di-n-octyl phthalate	2.00E-02	NA	2.00E-02	NA NA	NA	NA	NA	NA	Dibenzofuran
Hexachlorobenzene	8.00E-04	ND	8.00E-04	ND	1.60E+00	B 2	1.60E+00	B2	
n-Nitrosodiphenylamine	NA	NA	NA	ÑA	4.90E-03	B2	NA	B2	
Phenol	6.00E-01	NA	6.00E-01	NA	' NA	D	NA	D	
Carcinogenic PAHs (1)	NA	NA	.NA	NA	5.80E+00	B2	6.10E+00	B2	•
Noncarcinogenic PAHs		. •		•	•				
Acenaphthene	6.00E-02	NA	6.00E-01	NA	NA	D	NA	D	
Anthracene	3.00E-01	NA	3.00E+00	` NA	NA	D	NA	D	•
Fluoranthrene	4.00E-02	NA	4.00E-01	- NA	NA	NA ·	NA	NA	
Fluorene	4.00E-02	NA	4.00E-01	['] NA	· NA	D	NA	D	•
Naphthalene	4.00E-03	NA	4.00E-02	NA	NA	D	NA	D	
Pyrene	3.00E-02	NA	3.00E-01	· NA	NA	D	NA	D	

EPA Weight of Evidence Classifications are as follows:

Group A:-

Human Carcinogen. Sufficient evidence from epidemiologic studies to support a causal association between exposure and cancer.

Probable Human Carcinogen. Limited evidence of carcinogenicity in human from epidemiological studies. Group B1:-

Probable Human Carcinogen. Sufficient evidence of carcinogenicity in animals. Inadequate evidence of carcinogenicity in humans. Group B2:-

Possible Human Carcinogen. Limited evidence of carcinogenicity in animals. Group C:-

Not Classified. Inadequate evidence of carcinogenicity in animals. Group D:-

All toxicity Values unless otherwise noted are from Integrated Risk Information System (IRIS) June 1992 sessions,

and from Health Effects Assessment Summary Tables (HEAST)-1990 4th Quarter (USEPA, 1990).

(1). All carcinogenic PAHs are evaluated as Benzo(a)pyrene

NA: Not Available **ND**: Not Determined

Note:

HOOKER/RUCO SITE TOXICITY DATA FOR NONCARCINOGENIC AND POTENTIAL CARCINOGENIC EFFECTS DOSE RESPONSE EVALUATION

	Noncarchogen R	derence Dose	Subchronic Noncarcino	gen Reference Dose	34 4 3	archoger	Slope Factor	de la estata	A CALL MANAGED TO LE
Chemical Name	RID(oral)	RiD(inhalation)	AfD (oral sub)	RfD(inhalation, sub)	Oral SF	Weight	Inhalation SF	Weight	Compounds
	(mg/Kg-day)	(mg/Kg-day)	(mg/Kg-day)	(mg/Kg-day)	(mg/Kg-day)-1	11341	(mg/Kg-day)-1		w/o Criteria
PCBs And Pesticide:									
4,4'-DDD	NA .	NA	NA NA	· NA	2.40E-01	B2	NA	B2	
4,4'-DDE	NA	NA	NA	NA	3.40E-01	B2	NA	B2	
4,4'-DDT	5.00E-04	NA	5.00E-04	NA	3.40E-01	B2	3.40E-01	B2	
Beta-BHC	NA	NA	NA	NA	1.80E+00	С	1.80E+00	С	•
Chlordane (2)	6.00E-05	ND	6.00E-05	ND	1.30E+00	B 2	1.30E+00	B2	•
Dieldrin	5.00E-05	NA	5.00E-05	NA	1.60E+01	B2	1.60E+01	B 2	
Heptachlor Epoxide	1.30E-05	NA	5.00E-04	NA	9.10E+00	B2	9.10E+00	B2	
Total PCBS (3)	ND	ND	NA .	NA	7.70E+00	B2	ND	B2	• •

EPA Weight of Evidence Classifications are as follows:

Group A:- Human Ca

Human Carcinogen. Sufficient evidence from epidemiologic studies to support a causal association between exposure and cancer,

Group B1:-

Probable Human Carcinogen. Limited evidence of carcinogenicity in human from epidemiological studies.

Group B2:-Group C:- Probable Human Carcinogen. Sufficient evidence of carcinogenicity in animals. Inadequate evidence of carcinogenicity in humans.

Possible Human Carcinogen. Limited evidence of carcinogenicity in animals.

Group D:-

Not Classified. Inadequate evidence of carcinogenicity in animals.

Note:

All toxicity Values unless otherwise noted are from Integrated Risk Information System (IRIS) June 1992 sessions, and from Health Effects Assessment Summary Tables (HEAST)-1990 4th Quarter (USEPA, 1990).

NA :Not Available
ND : Not Determined

- (2) Alpha chlordane is evaluated as chlordane.
- (3) Alli PCBs are evaluated as Aroclor 1260

HOOKER/RUCO SITE TOXICITY DATA FOR NONCARCINOGENIC AND POTENTIAL CARCINOGENIC EFFECTS DOSE RESPONSE EVALUATION

	Noncerchopen	Reference Dose	Subchronic Noncarcino	en Reference Dose	ing <u>a statistic (</u>	Cardnoge	n Slope Factor	1.5	The path of
Chemical Name	RfD(oral)	RfD(inhalation)	AfD (oral sub)	RfD(inhalation, sub)	Oral SF	Weight	Inhalation SF	Weight	Compounds
建筑线线和原设设施设施	(mg/Kg-day/)	(mg/Kg-day)	(mg/Kg-day)	(mg/Kg-day)	(mg/Kg-day)-1		(mg/Kg-day)-1		w/o Criteria
Inorganics:									
Antimony	4.00E-04	NA	4.00E-04	NA	NA	NA	NA	NA	Cobalt
Arsenic	3.00E-04	NA	1.00E-03	NA	1.75E+00	Α	1.50E+01	Α	Copper
Barlum	7.00E-02	1.00E-04	5.00E-02	1.00E-03	NA	NA	NA	NA	Iron
Beryllium	5.00E-03	NA	5.00E-03	NA ·	4.30E+00	B2	8.40E+00	B2 `	Lead
Cadmlum	1.00E-03food	NA .	NA	NA	NA	Bí	6.30E+00	B1	
	5.00E-04water								
Chromium (III)	1.00E+00	NA	1.00E+00	NA	NA	NA	NA	NA	
Chromium (VI)	5.00E-03	NA	2.00E-02	NA	NA	· NA	4.20E+01	Α	
Manganese	1.00E-01	1,10E-04	1.00E-01	1.10E-04	NA	D.	NA	D	•
Mercury	3.00E-04	8.60E-05	3.00E-04	8.60E-05	NA	D	NA	D	
Nickel	2.00E-02	NA	2.00E-02	NA ·	NA	Α	8.40E-01	Α	
Selenium	5.00E-03	NA	NA	' NA	' NA	D	NA	D	·
Silver	3.00E-03	NA	3.00E-03	NA	NA	D	NA	D	
Thallium	8.00E-05	NA	7.00E-04	NA	NA	D	NA	D	
Vanadium	7.00E-03	NA	7.00E-03	NA	NA	ŅA	NA	NA	
Zinc	2.00E-01	NA	2.00E-01	NA	NA	D	NA	D	

EPA Weight of Evidence Classifications are as follows:

Group A:- Human Carcinogen. Sufficient evidence from epidemiologic studies to support a causal association between exposure and cancer.

Group B1: Probable Human Carchogen. Limited evidence of carcinogenicity in human from epidemiological studies.

Group B2:- Probable Human Carcinogen. Sufficient evidence of carcinogenicity in animals. Inadequate evidence of carcinogenicity in humans.

Group C:- Possible Human Carcinogen. Limited evidence of carcinogenicity in animals.

Group D: Not Classified. Inadequate evidence of carcinogenicity in animals.

All toxicity Values unless otherwise noted are from Integrated Risk Information System (IRIS) June 1992 sessions,

and from Health Effects Assessment Summary Tables (HEAST)-1990 4th Quarter (USEPA, 1990).

NA :Not Available
ND : Not Determined

Note:

HOOKER/RUCO SITE SUMMARY ACROSS EXPOSURE PATHWAYS PRESENT/FUTURE USE SCENARIOS-RESIDENTS ADULTS

Future Use Scenarios: Fence-Line Adult Residents	rcinogenic Risk Levels asonable Maximum Exposure	Noncarcinogenic Hazard Index Values Reasonable Maximum Exposure				
1) Exposure to Ground Water	•					
Ingestion	2.21E-03	4.8	9E+00			
Inhalation	5.06E-04	5.8	32E-02			
Dermal Contact	1.12E-04	2.0	01E-01			
2) Exposure to Surface Soil	C 405 00	1.2	245.00			
Inhalation	6.40E-09	1.6	64E-09			

Total Health Risk = Ground water ingestion + Ground water inhalation + Ground water dermal contact + Surface soil inhalation

SUMMATION RESULTS

Carcinogens

Reasonable Maximum Exposure=

2.83E-03

Noncarcinogens

Reasonable Maximum Exposure=

5.15E+00

HOOKER/RUCO SITE SUMMARY ACROSS EXPOSURE PATHWAYS PRESENT/FUTURE USE SCENARIOS-RESIDENTS ADULTS

Present/Future Use Scenarios: Off-Site Adult Residents	Carcinogenic Risk Levels Reasonable Maximum Exposure	Noncarcinogenic Hazard Index Values Reasonable Maximum Exposure
1) Exposure to Surface Soil	C 40E 00	4.645.00
Inhalation	6.40E-09	1.64E-09
		•
Total Health Risk = Surface soil inhalation		•
SUMMATION RESULTS		
Carcinogens		
Reasonable Maximum Exposure=	6.40E-09	
Noncarcinogens		
Reasonable Maximum Exposure=	1.64E-09	

HOOKER/RUCO SITE SUMMARY ACROSS EXPOSURE PATHWAYS PRESENT/FUTURE USE SCENARIOS-RESIDENT CHILDREN

Future Use Scenarios: Dff-Site Child Residents	Carcinogenic Risk Levels Reasonable Maximum Exposure	Noncarcinogenic Hazard Index Values Reasonable Maximum Exposure
•		•
) Exposure to Ground Water		
Ingestion	8.84E-04	1.02E+01
Inhalation	1.09E-04	1.25E-01
Dermal Contact	1.34E-05	1.22E-01
) Exposure to Surface Soil		
Inhalation	2.56E-09	3.28E-09
otal Health Risk = Ground water ingestion + Grou	and water inhalation + Ground water dermal	contact + Surface soil inhalation
	and water inhalation + Ground water dermal	contact + Surface soil inhalation
otal Health Risk = Ground water ingestion + Ground water + Ground	and water inhalation + Ground water dermal	contact + Surface soil inhalation
SUMMATION RESULTS	and water inhalation + Ground water dermal	contact + Surface soil inhalation
SUMMATION RESULTS Carcinogens		contact + Surface soil inhalation
SUMMATION RESULTS Farcinogens Reasonable Maximum Exposure=		contact + Surface soil inhalation

HOOKER/RUCO SITE SUMMARY ACROSS EXPOSURE PATHWAYS PRESENT/FUTURE USE SCENARIOS-RESIDENT CHILDREN

Present/Future Use Scenarios: Off-Site Child Residents	Carcinogenic Risk Levels Reasonable Maximum Exposure	Noncarcinogenic Hazard Index Values Reasonable Maximum Exposure		
Exposure to Surface Soil Inhalation	2.56E-09	3.28E-09		
		•		
Total Health Risk = Surface soil inhalation				
SUMMATION RESULTS		· · · · · · · · · · · · · · · · · · ·		
Carcinogens				
Reasonable Maximum Exposure=	2.56E-09			
Noncarcinogens				
Reasonable Maximum Exposure=	3.28E-09			

Page 2

TABLE 17

ARARs/TBCs FOR GROUNDWATER CHEMICALS OF CONCERN (µg/L) HOOKER/RUCO SITE HICKSVILLE, NEW YORK

		RI Results	Pauga of	Federal	NY State S	Namadanda	NY State	NY State GW	
•	CRQLI	Location of Maximum	Range of Detected	Standards	. INT State 5	GW Quality	Guidance	Gw Effluent	
Compound	CRDL	Conc. (a)	Conc.	MCLs/MCLGs	MCLs (b)(c)	Standards .	TAGM ()	Standard	PRG
Volatile Organics (Geraghty	& Miller, 1994; H	INUS, 1994)					•		
Trichloroethene	5	HN241	ND-58,000	5 (FMCL)	5	5	5	10	5
Toluene	5	HN29S	ND-39	1,000 (FMCL)	5	5	5	NA	5
1,1-Dichloroethane	5	HN29S	ND-880		5	5	5 ·	NA	5
1,2-Dichloroethene	5	HN29S	ND-3,600	70 cis (FMCL)	5	5	5 (cis) ^(g)	NA	5 .
				100 trans			5 (trans) (g)		
1,1,1-Trichloroethane	5	HN29S	ND-10,000	200 (FMCL)	5 .	5 .	5	NA	5
Tetrachloroethene	5	HN-29S	ND-1,400	5 (FMCL)	5	5	5	NA	5
1,1-Dichloroethene	5	GP-8	ND-420	7 (FMCL)	5	5	5	NA	5
Carbon tetrachloride	5	HN24I	ND-8	5 (FMCL)	5	' 5	5	5	5
Xylenes	5	HN29S	ND-19	10,000 (FMCL)	5	5	5 (ortho) 5 (meta) 5 (para)	NA	5
Vinyl chloride	2	MW-521	ND-2,300	2 (FMCL)	2	´ 2	2	NA	.2
Semi-Volatile Organics (HN	US, 1994)								
Bis(2ethylhexyl)phthalate	10	GP-11	ND-150	6 (FMCL)	50.	50	50	4,200	6
Total Phenols (h)	10(individual)	HN29S	ND-11 [50		1 (total phenols)	NA	1 (total phenols)
Benzo(b)fluoranthene	10	USGS N10623 ⁽ⁱ⁾	ND-2 J	0.2 (PMCL)	50		0.002	NA	0.002 (TOGS)
Inorganics (Total) (HNUS, 1	994) (Legette, Bras	shears, & Grahan	n, Inc. 1990) (Geraghty and Mil	ler, 1994) ^(ç)		•		
Aluminum	200	HN27S	ND-33,800	200 (FSMCL)				2,000	200 (FMCL)
Arsenic	10	K-2	ND-59	50 (Review)	50	25	25	50	25
Cadmium	5	HN27S	ND-392	5 (FMCLG)	10 .	10	5 ^(g)	20	5
Chromium, Total	10	HN27S	ND-169	100 (FMCLG)	100	50	50	NA	50
Chromium, Hexavalent	10	HN25	ND-174 J			50	50	100	50
Copper	100	GM13S	ND-838 J	1,300 (FMCLG)	1,000 (SMCL)	200	200	1,000	200
Iron	3	GM15S	114-229,000		300 (SMCL) (e)	300 ^(e)	300 ^(e)	600	300
Lead	5,000	GM15S	ND-169	•	15 (Action Level)	25	15 ^(g)	50	15
LCau .	2,000	CIVITOS	140-107	12 (venou read)	12 (Verion readi)	23	13	50	13

ARARs/FBCs FOR GROUNDWATER CHEMICALS OF CONCERN (µg/L) HOOKER/RUCO SITE HICKSVILLE, NEW YORK

		RI Results	•					NY State	
		Location of	Range of	Federal	NY State S	tandards	NY State	GW -	•
	CRQL/	Maximum	Detected	Standards		GW Quality	Guidance	Effluent	
Compound	CRDL	. Conc. (a)	Conc.	MCLs/MCLGs	MCLs (b)(c)	Standards	TAGM ^(f)	Standard	PRG
				\sim					
Manganese	0.2	GM13S	7.65-1,720 J	200 (LMCLG)	300 (SMCL) (e)	300 ^(e)	300 ^(e)	600	200 (LMCLG)
Thallium	50	HN24I	ND-3.1 J	2 (FMCL)			4	NA	2 (FMCL)
Vanadium	20	HN29S	ND-419			+	250	NA	250
Cyanide	·	HN27S	ND-2,690	200 (FMCL)		100	100	400	100 (FMCL)
Nickel	5,000	GM13S	ND-132	100 (FMCL)	•••		100	2,000	100 (FMCL)

Notes:

--- - Not Detected

F - Final

L - Listed

P - Proposed

Secondary

CRDL - Contract Required Detection Limit

CRQL - Contract Required Quantitation Limit

IDL - Instrument Detection Limit

MCL - Maximum Contaminant Level

MCLG - Maximum Contaminant Level Goals

PRG - Preliminary Remedial Action Goal = most stringent of FMCLs Groundwater Quality Standard or Contained in Policy.

- Includes data from all sampling rounds since 1990.

- Total Principal Organic Contaminants (POCs) (i.e., includes listed volatile organics and Unspecified Organic Contaminants (UOCs) not to exceed 100 μg/L total.
- Reference: New York Public Supply Regulations, Part 5-1, 07/17/92
- Reference: New York Water Classifications and Quality Standards, Title 6, Chapter V, Part 703.
 - Combined concentration of iron and manganese shall not exceed 500 µg/L. Iron and manganese not to exceed 300 µg/L.
- Reference: New York Technical Manual, "Contained In" Criteria for Environmental Media.
- Only monitoring wells on NWIRP property (designated with prefix HN-) and Hooker/Ruco Site (such as K-2) were sampled and analyzed for semi-VOCs.
 Only a summary of analytical data is available from the Hooker/Ruco Site.
- (h) Total Phenols = 2-Methylphenol + 4-Methylphenol + 2,4-Dimethylphenol.
 - Benzo(b)fluoranthene was detected only in USGS well N10623. This detection is suspected to be due to runoff from a nearby asphalt road through leakage in the well cap.

(e)

TABLE 18 SELECTED REMEDY (ALTERNATIVE 3) COST ESTIMATES

CAPITAL COST		3	
Well Installation	A. Injection	\$270,000	
	B. Monitoring	\$90,000	
Forcemain	A. Header Pipe	\$190,000	
	B. Down Well Piping	\$0	
Land Purchase		\$150,000	
Materials and Installation	A. Site Improvements	\$17,000	
	B. Equipment	\$135,000	
·	C. Mechanical	\$25,000	
	D. Electrical	\$36,000	
Engineering (10%)		\$91,300	
Field Construction (5%)		\$45,650	
Contingency (20%)	\$209,990		
TOTAL CAPITAL COST		\$1,259,940	
ANNUAL O&M COST			
VCM Monitoring		\$28,000	
Utilities - Electric		\$93,000	
Reporting		\$34,000	
Labor (full time)		\$65,000	
Equipment Replacement (5%)	\$45,650		
Contingency (20%)		\$53,130	
TOTAL ANNUAL COST		\$318,780	
PRESENT WORTH COST*	·	\$3,800,000	

^{*} assumes a 10-year operating period plus 2 supplemental years of nutrient addition and a 7% discount rate

TABLE 19 CONTINGENCY REMEDY (ALTERNATIVE 2) COST ESTIMATE

CAPITAL COST	
Well Installation	\$560,000
Well Pumps	\$50,000
Forcemain	\$445,000
Recharge Basin	\$55,000
Land Purchase / Access Payments	\$300,000
VCM Treatment System - Equipment	\$725,000
VCM Treatment System - Materials & Installation	\$905,000
Engineering and Procurement	\$304,000
Field Construction Expense	\$152,000
Contingency (20%)	\$699,000
TOTAL CAPITAL COST	\$4,195,000
ANNUAL O&M COST	
VCM Treatment System	\$300 000
VCM Monitoring	\$47,000
Reporting (monthly)	\$34,000
Labor (1 person - full time)	\$65,000
Equipment Replacement (5%)	\$160,000
Contingency (20%)	\$121,000
TOTAL ANNUAL O&M COST	\$727,000
PRESENT-WORTH COST*	\$13,200,000

^{*} assumes an 30-year operating period and a discount rate of 7%.

APPENDIX III

ADMINISTRATIVE RECORD INDEX

HOOKER CHEMICAL/RUCO POLYMERS SUPERFUND SITE OPERABLE UNIT 3 ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

3.0 REMEDIAL INVESTIGATION

3.4 Remedial Investigation Reports

p. 300001Report: Remedial Investigation Report. Operable

300741 Unit 3. Hooker Chemical/Ruco Polymers Superfund

Site, Hicksville, New York, prepared by

Conestoga-Rovers & Associates, prepared for U.S.

EPA, Region II, July 21, 2000.

4.0 FEASIBILITY STUDY

4.3 Feasibility Study Reports

- p. 400001- Report: Evaluation of MW-52 Area Groundwater
 400041 Extraction System for Recovery of Groundwater from
 the Hooker/Ruco Site, Hicksville, New York,
 prepared by Conestoga-Rovers & Associates,
 prepared for U. S. EPA, Region II, July 1998.
- p. 400042Report: Feasibility Study for Operable Unit 3.

 Vinyl Chloride Subplume in the Vicinity of MW-52.

 Hicksville, New York, prepared by Conestoga-Rovers
 & Associates, prepared for U.S. EPA, Region II,

 July 25, 2000. (Attachment: Rationale for
 Calculating the Present-Worth Cost for
 Alternatives 1, 2 and 3.)

10.0 PUBLIC PARTICIPATION

10.1 Comments and Responses

P. 10.00001- Letter to Mr. Syed Quadri, Western New York
10.00004 Remediation Section, Emergency and Remedial
Response Division, U. S. EPA, Region II, from Mr.
Steve Whyte, Project Manager, Glenn Springs
Holdings, Inc., re: Proposed Remedial Action Plan

(PRAP), Hooker Chemical/Ruco Polymer Corporation Site, Hicksville, New York, August 25, 2000.

P. 10.00005- Letter to Mr. Syed Quadri, U. S. EPA, Project 10.00009 Manager, from Mr. Carlo SanGiovanni, Project Manager, and Mr. Michael F. Wolfert, Project Director, ARCADIS Geraghty & Miller, Inc., re: Comments on the proposed groundwater PRAP for the Ruco site on behalf of the Northrop Grumman Corporation, August 28, 2000.

10.4 Public Meeting Transcripts

P. 10.00010- Transcript: Public Meeting for the Proposed Plan 10.00111 for the Hooker Chemical/Ruco Polymer Site, Oyster Bay Town Hall, prepared by Fink & Carney Reporting, prepared for U. S. EPA, Region II, August 15, 2000.

10.10 Correspondence

P. 10.00112- Letter to Mr. Syed M. Quadri, Project Manager, New 10.00112 York Remediation Branch, Emergency and Remedial Response Division, U. S. EPA, from Mr. Joseph A. F. Sadowski, re: request for a copy of the minutes, undated.

Note: The report titled Revised Final Risk Assessment and Fate and Transport Report, Operable Unit 1, Hooker Chemical/Ruco Polymer Site, Hicksville, New York, is available in the Administrative Record for the Hooker/Ruco Site, Operable Unit 1, and is numbered HKR-001-1409 to 1746.

APPENDIX IV

STATE LETTER OF CONCURRENCE

New York State Department of Environmental Conservation Division of Environmental Remediation, Room 260B

50 Wolf Road, Albany, New York 12233-7010 Phone: (518) 457-5861 • FAX: (518) 485-8404

Website: www.dec.state.ny.us



Mr. Richard L. Caspe
Director
Emergency Response and Remedial Division
USEPA Region II
290 Broadway - Floor 19 - #E38
New York, New York 10007-1866

SEP 2 8 2000

Dear Mr. Caspe:

RE: Hooker/Ruco Federal Superfund Site Nassau County Site No. 1-30-004

The New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH) have reviewed the Hooker Chemical/Ruco Polymer (Hooker Ruco Site) Operable Unit 3 (OU3) Record of Decision (ROD). The selected remedy includes in-situ treatment of vinyl chloride monomer (VCM) through bio-sparging. If necessary, nutrients will be added to enhance biological activity. The ROD contains a contingency plan for groundwater extraction and treatment to contain and remove the VCM subplume if in-situ bioremediation fails to prevent the VCM from reaching the Northrop Grumman Onsite Containment (ONCT) system. The ROD also merges the onsite groundwater extraction and treatment and soils flushing component of the OU1 ROD with OU3, and also recognizes that the downgradient Northrop Grumman Onsite Containment (ONCT) System is intercepting this plume.

There will be a monitoring plan that will verify the effectiveness of all the components of the Hooker Ruco Site OU3 groundwater remedy including the fate and transport of VCM, the capture of residual VOC contamination by the Northrop Grumman ONCT system, and the attenuation of the tentatively identified compounds (TICs). This will include groundwater sampling for VCM, total volatile organics including site related percloroethylene (PCE) and trichloroethylene (TCE) and TICs. Special monitoring of the vadose zone for site related contaminants will also take place in the area of the bio-sparging.

Therefore, the remedy selected in the Hooker Ruco OU3 ROD, in conjunction with existing and proposed controls addressing the regional VOC groundwater contaminant plume, will be protective of human health and the environment. The NYSDEC concurs with this remedy.

- Jazzy

Director

Division of Environmental Remediation

c: J. La Padula, USEPA

A. Carlson, NYSDOH

C. Hodgeman, NCDOH

APPENDIX V

RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY HOOKER CHEMICAL/RUCO POLYMER SUPERFUND SITE

INTRODUCTION

A responsiveness summary is required by Superfund regulation. It provides a summary of public comments and concerns received during the public comment period and the responses of the United States Environmental Protection Agency (EPA) and the New York State Department of Environmental Conservation (NYSDEC) to those comments and concerns. All comments summarized in this document have been considered in EPA and NYSDEC's final decision for the selected remedy for the Hooker Chemical/Ruco Polymer Superfund Site (Site).

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

Community involvement at the Site has been moderate. EPA has served as the lead agency for community relations and remedial activities at the Site.

The Remedial Investigation/Feasibility Study (RI/FS) Report for Operable Unit 3 and the Proposed Plan for the Site were released to the public for comment on July 28, 2000. These documents, as well as other documents in the administrative record (see Administrative Record Index, Appendix III) have been made available to the public at information repositories maintained at the EPA Region II Docket Room located at 290 Broadway, New York, New York and the Hicksville Public Library, Hicksville, New York. A public notice announcing the public meeting on the Proposed Plan as well as the availability of the above-referenced documents was published in Newsday on July 28, 2000. The public comment period established in the public notice was from July 28 to August 28, 2000. A request for a 2-week extension to the public comment period was granted by EPA and the public comment period was extended through September 12, 2000. EPA's decision to extend the comment period was announced at the August 15, 2000 public meeting, as well as publicized through mailings to the more than 400 citizens and other interested parties on the Site mailing list.

The August 15th public meeting was held at the Oyster Bay Town Hall, 54 Audrey Avenue, Oyster Bay, New York to present the Proposed Plan and to address questions and comments concerning the Plan and other details related to the RI/FS Report raised by local officials, residents and other interested parties. Responses to the comments and questions received at the public meeting, along with other written comments received during the public comment period, are included in this Responsiveness Summary.

OVERVIEW

The selected remedy includes in-situ biosparging technology to treat the vinyl chloride monomer (VCM) subplume to a level that achieves cleanup standards and whereby supplemental treatment for VCM at the groundwater extraction and treatment system¹ at the downgradient Northrop Grumman Aerospace Corporation (Northrop) facility is not required. If necessary, this alternative would also utilize a supplemental bioremediation technology (nutrient addition) following the biosparging treatment to enhance the degradation of VCM in the aguifer. The addition of nutrients to stimulate the microbial population would also enhance degradation of volatile organic compounds (VOCs) trichloroethylene (TCE), perchloroethylene (PCE) as well as other VOCs which have been tentatively identified (TICs). It is estimated that biosparging will be required for a maximum period of 10 years and the supplemental nutrient addition would occur over a two-year period to effectively enhance the degradation of the VOCs.

If it is determined during the implementation and long-term monitoring of the selected remedy that the technology selected is not effectively reducing the VCM concentrations in a reasonable time frame, then VCM subplume extraction and treatment would be implemented as a contingency remedy. Further, if the treatment system at the Northrop facility ceases operation before the regional aquifer is restored, EPA would re-evaluate the protectiveness of the selected remedy.

The selected remedy for Operable Unit 3 also amends the ROD for components of the Operable Unit 1 remedy.

Attached to this Responsiveness Summary are the following Appendices:

Appendix A - Proposed Plan Appendix B - Public Notice

Appendix C - August 15, 2000 Public Meeting Attendance Sheet

Appendix D - Letters Submitted During the Public Comment

Period

This treatment system is being operated as an Interim Remedial Measure (IRM).

SUMMARY OF COMMENTS AND EPA'S RESPONSES

Specific comments have been organized as follows:

- General Site Issues
- Site Characteristics and Aquifer Characteristics
- Public Health and Risk Assessment Issues
- Remedy Selection Issues
- Remedy Implementation Issues
- Miscellaneous

A summary of comments and concerns regarding the Site investigation and remedy selection process and EPA's responses are provided below. A number of comments were addressed to the New York Department of Health (NYSDOH) and pertained to their activities. EPA has also received questions directed to the NYSDEC concerning the Northrop and Navy sites. Those questions were not addressed in this responsiveness summary but have been forwarded to the respective Departments.

General Site Issues

Comment # 1: Were soil samples collected from the surrounding
properties?

Response # 1: Yes. Soil samples were collected in the suspected source areas at the Hooker/Ruco Facility. Sampling continued outward from the source area until the contamination was fully delineated. There has been extensive sampling of the soils on the Northrop and Naval Weapons Industrial Reserve Plant (NWIRP) sites as portions of these sites were remediated and removed from the State superfund list or are undergoing closure pursuant to the Resource Conservation and Recovery Act (RCRA).

Comment # 2: Will the liability provisions of CERCLA prevent anyone from purchasing the property?

Response # 2: The liability provision of CERCLA should not deter purchasing the Site property. EPA encourages responsible redevelopment of sites and believes that environmental cleanup and economic redevelopment are not mutually exclusive. EPA promotes the redevelopment of previously contaminated properties by facilitating the transfer of property, removing liability barriers, and providing financial assistance to States and Tribes. Over the past several years, EPA has initiated several administrative reforms to aid in this task and has identified various options to encourage the cleanup and redevelopment of contaminated properties, giving prospective purchasers, lenders, and property owners more

assurances that acquisition of such property will not also mean acquisition of liability. Two of the most effective tools have been development of prospective purchaser agreements (PPAs) and issuance of comfort letters. EPA guidance documents and fact sheets on these tools and others can be found at:

http://www.epa.gov/superfund/programs/reforms/types/econ.htm

Site Characteristics and Aquifer Characteristics

Comment # 3: Specifically, where does the Site lie in relation to the Long Island groundwater divide? Does the clay identified in some borings cause the groundwater to flow north? The validity of the interpretation of the groundwater data in the FS Report was also questioned.

Response # 3: The groundwater divide is at least two to three miles to the north of the Site. The general groundwater flow in the area of the Site is south from the groundwater divide. During the years that Grumman was in operation, pumping from its production wells exerted an influence of the groundwater inducing an eastward component of flow. During the various investigations, a series of monitoring wells have been placed in the area. Measurements from those wells confirm that the direction of ground water flow in the area is to the south-southeast. While there have been sporadic findings of clay in some of the borings, there is no indication that there is any connection between those areas, i.e., there is no continuous layer of clay where water or contaminants entering the ground would pool or move in a northward direction for Water entering the ground moves downward until it any distance. reaches the water table then migrates in a south-southeasterly direction. The groundwater movement as depicted in the FS report has been reviewed by EPA, NYSDEC, and the United States Geological Survey. All reviewers have concluded that the interpretation of the groundwater flow depicted in the FS Report is valid.

Comment # 4: Metals are present in the groundwater beneath the Site and arsenic and manganese exceeded the to-be-considered (TBC) criteria. However, these excursions were limited to only a few wells and at concentrations only slightly above the published health standard criteria. Consequently, the presence of the two metals in a few wells does not make metals contaminants of concern at the Site, especially when compared to the organic chemicals present.

Response # 4: Metals were not identified as primary contaminants of concern in the Proposed Plan, but rather as secondary contaminants. This classification is intended to place the

emphasis on VOCs, but notes the presence of metals above levels of concern in a manner consistent with the comment.

Comment # 5: How large is the plume of contamination and what are the geographic boundaries using New South Road and Route 107 as reference points?

Response # 5: The regional VOC plume is approximately 12,100 ft long, 9,600 ft wide and 580 ft deep. Approximate boundaries are New South Road and Route 107 to the West and Stewart Avenue to the East. In the deeper groundwater to the South, the plume approaches Hempstead Turnpike.

Comment # 6: Figure 4.2 of the Remedial Investigation Report (RI Report) shows that pollutants are entering the regional groundwater divide then entering the Lloyd Aquifer.

Response # 6: Figure 4.2 depicts a generalized regional hydrogeologic cross-section through Nassau County in the area of the Site and does not depict the contaminant plume but rather general groundwater flow direction for the area. The Site is located several miles to the south of the regional groundwater divide. Contamination entering the groundwater from the Site would flow toward the south.

Comment # 7: Figure H.5.7 and Figure 5.1 of the RI Report shows the Ruco, Grumman and Navy facilities and two public supply wells with contaminants falling into the Lloyd Aquifer by following the well casings.

EPA Response # 7: Figure H.5.7 depicts the calculated hydraulic head in the Magothy Aquifer at a model layer from 360 ft to 495 ft below sea level. Figure 5.1 depicts trichloroethylene (TCE) concentrations detected in wells during the mid 1970's in the study area. The deepest monitoring wells are completed in the Magothy Aquifer. The Magothy Aquifer is separated from the Lloyd Aquifer by an extensive layer of clay (the Raritan Confining Unit). The are no wells in the study area that are deep enough to enter the Lloyd Aquifer. Therefore, contamination cannot enter the Lloyd by traveling down well casings.

Comment # 8: Since the contaminants are found at 600 ft deep the water tested is from the Lloyd Aquifer.

Response # 8: The Magothy Aquifer extends below 600 ft. in the area of the Site where the contaminants are at their deepest. Below the Magothy lies a layer of low permeability known as the Raritan Confining Unit that averages 175 ft thick that would act as

a barrier to prevent contaminants from moving from the Magothy to the Lloyd.

Comment # 9: Figure 5.12 of the RI Report shows pools heading to
the north - north east.

Response # 9: Figure 5.12 depicts a schematic of aquifer zones in the area of the Hooker/Ruco Site at various depths. Included within each zone are contours showing the concentrations of TCE detected in monitoring wells. These contours are not underground streams or pools. The drawing also notes that the vertical direction is not to scale. The flow directions are not shown on the concentration schematic and it is incorrect to state that groundwater flows to the north based on this drawing. Groundwater and contaminant flow directions are depicted on other drawings that show the flow is to the south-southeast.

Public Health and Risk Assessment Issues

Comment # 10: What health studies have been performed in the area
of the Site?

Response # 10: NYSDOH has done several cancer incidence investigations in and around the Bethpage area. Information about these can be obtained by calling the toll-free telephone number for the NYSDOH Center for Environmental Health: 1-800-458-1158, extension 2-7530.

Comment # 11: Are Bethpage and the other water districts prepared for any situation that may arise from the local plume of groundwater contamination?

Response # 11: The Bethpage Water District has VOC removal treatment systems at its three well fields downgradient of the sites. The treatment system that is being operated by Northrop under NYSDEC oversight as an IRM is designed to prevent further migration of the contaminant plume to the area of the wells. Monitoring programs will continue to track any movement of the plume and to evaluate the effectiveness of the VOC removal treatment systems. If other wells become threatened by the plume or if the treatment systems fails, these monitoring systems will provide early warnings and alert authorities in sufficient time to take action to ensure the continued supply of clean water to the public.

Comment # 12: The future exposure scenario outlined in the Proposed Plan is highly unlikely to occur considering that:

- i) a Nassau County ordinance permits obtaining drinking water only from a public supply source; and
- ii) the public supply sources are being monitored and treatment is being implemented as needed.

This unlikely future exposure scenario should be reiterated so that public concerns regarding the estimated future residential groundwater use scenario risks are put in perspective.

Response # 12: The ROD, the Proposed Plan, and the risk assessment state that the current use of groundwater at the Site does not pose a unacceptable risk to human health since no one is using the groundwater for domestic purposes. However, the purpose of the risk assessment is to determine whether unacceptable risk to the public would be incurred if groundwater at the Site is used without treatment. This determination is based upon conditions at the Site, irrespective of controls used at downgradient receptor locations. In this manner, appropriate action can be taken before contaminants are detected either in future on-Site wells or in downgradient water supply wells or public water distribution systems. The fact that public water supplies are monitored and treated is good, but not directly relevant to the baseline determination. It is agreed that the future on-Site groundwater use scenario is conservative, but it is appropriately so. The groundwater at the Site is classified as Class GA by New York State, suitable for potable supply. This is reflected in the ROD. It should be noted that at the public meeting, the public was informed that current drinking water supplies are protected from the groundwater plume of contamination.

By way of clarification, Nassau County Public Health Ordinance Article IV prohibits the installation of new private water wells in areas served by public water supplies. The installation of public water wells is not prohibited under Article IV.

Remedy Selection Issues

Comment # 13: Who will make the decision as to what remedy is selected and are the local officials invited to participate?

Response # 13: After considering the comments received on the Proposed Plan and the FS Report, including comments from local officials, the Regional Administrator for EPA Region 2 will make the remedial decision. EPA will then issue this determination as a ROD for the Hooker/Ruco Site.

Comment # 14: The Proposed Plan identifies Alternative 2 (pumping
and treatment to groundwater to meet ARARs) as the contingency

remedy if in-situ biosparging is not effective. It is possible, that during the operation of the biosparging remedy, new technologies may be developed. Thus, it is suggested that new treatment technologies be considered if a contingency remedy becomes necessary in the future, so that the most effective technology will be selected.

Given the recent acknowledgment of the value of natural attenuation, it may not be necessary to pump and treat down to concentrations that meet ARARs. Some monitored natural attenuation may also be included as part of the contingency remedy. Thus an alternative to the specified contingency remedy is to pump and treat to remove a sufficient mass of VCM such that supplemental VCM treatment of the air discharge from the Northrop Treatment System would not be needed. This would then be consistent with the level of remediation effort proposed for the preferred remedial alternative.

Response # 14: EPA's preferred remedy has as its goal achieving MCLs in groundwater. The contingency remedy was identified from alternatives that are currently available. If the selected remedy were not to be effective in achieving these goals, the contingency remedy would be implemented. EPA can reevaluate remedy decisions where significant new scientific information, technological advancements or other considerations become available to achieve the proper level of protectiveness of human health and the environment while enhancing overall remedy and cost-effectiveness. Further, if the data collected by the monitoring program indicates that natural attenuation is occurring and will restore the aquifer to its beneficial use without further contaminant migration, it could be evaluated as part of this process.

Comment # 15: All remedial approaches considered should intercept and treat the VCM subplume before it affects the downgradient Northrop Treatment System.

Response # 15: A major consideration in the evaluation of alternatives in selecting the remedy for the Site is that the potential remedy treat the VCM sufficiently so that the Northrop Treatment System is not impacted. In addition, the proposed sentry monitoring is intended to confirm that biosparging and supplemental enhanced bioremediation are effectively addressing the VCM contamination and provide sufficient lead time to implement the contingency remedy if VCM adequate reduction is not progressing as planned.

Comment # 16: If it is shown that biosparging is not effective and a pump and treat system is needed (as a contingency remedy), it

should be designed so that it does not interfere with the goals of the downgradient Northrop Treatment System.

Response # 16: EPA agrees that if a pump and treat system is needed, it should not interfere with the Northrop Treatment System. Groundwater modeling would be undertaken to ensure that no detrimental interference occurs.

Comment # 17: Based on a review of the pre-design data collected by Conestoga Rovers & Associates (CRA), the subsurface environment at the Hooker/Ruco Facility and immediately downgradient is anaerobic and reducing. Biosparging, by its very nature of adding oxygen to the subsurface, will disrupt the anaerobic and reducing environment that exists at and south-southeast of the Site will disrupt the natural degradation of the source-derived chlorinated compounds, i.e., TCE and PCE. Except for the TCE, PCE and DCE that is stripped during the biosparging process, there will be no additional remediation of these compounds via the biosparge system. Therefore, the Northrop Treatment System will have to treat these compounds from the Hooker/Ruco Facility and the previously anaerobic off-Site area. An evaluation must be made to impact that the disruption of the anaerobic assess the biodegradation zone would have on the downgradient Northrop Treatment System.

Response # 17: It is true that the aquifer geochemical conditions immediately downgradient of the Site are reducing and that biosparging is intended to create more oxidizing conditions. Therefore, it is agreed that the aerobic biosparging process will disrupt the anaerobic and reducing environment in the area where the biosparging system will be injecting air/oxygen.

Due to the overall low concentrations of organic carbon, however, the degree of reductive chlorination, which appears to be occurring in the area of strongly reducing conditions, is expected to be fairly limited. While some degradation of PCE and TCE is likely occurring under the present conditions, the impact of biosparging on these compounds is expected to be limited.

Pursuant to Occidental's proposed OU-3 Predesign Investigation Measures Plan, submitted on June 11, 1999, test injection wells are to be installed downgradient of GW-10I and MW-52, which are downgradient of the area of anaerobic reducing conditions. Furthermore, based on the data currently available, the full scale biosparging injection system will likely be installed downgradient of well cluster MW-52. Thus, the proposed OU-3 predesign testing and most likely the full scale biosparging system should not influence the area of anaerobic reducing conditions and will not

disrupt the natural degradation of PCE and TCE in this area.

VCM, however, would significantly impact the existing Northrop Treatment System if VCM were not treated, so it is the focus of the treatment. Because VCM is a reduced compound, it is generally more easily oxidized than reduced. For this reason, biosparging was chosen, although it is acknowledged that reductive dechlorination is also possible. It should be noted that the Record of Decision allows for "supplemental bioremediation" in the event that biosparging is not achieving the remedial objectives.

During the remedial design phase an evaluation will be made to assess the impact that the biosparging could have on the anaerobic biodegradation zone and the Northrop Treatment System.

Comment # 18: Biosparging downgradient of the source area (in the transitional and aerobic environments where VCM persists, but the aerobically degradable compounds, like ketones and alcohols, are depleted) should enhance the degradation of VCM.

Response # 18: EPA agrees.

Comment # 19: The goal of the biosparge treatment system is to treat the VCM subplume to a level that will ensure that there will be no need for supplemental treatment of VCM at the Northrop Treatment System. However, a VCM contingency plan should be developed to protect the treatment system from levels of untreated VCM that, if treated by the Northrop system, would result in excursions of air discharge standards.

Response # 19: The goal of the selected remedy is to restore the groundwater to meet MCLs. The selected remedy includes a contingency to pump and treat the VCM subplume if biosparging is not effective. Also, monitoring of the remedial action will provide an early warning if the VCM is migrating to the extent that ability of the existing Northrop Treatment System to effectively treat the VCM subplume might be compromised. migration occur, ample time will be available to put measures in place to ensure the public is protected and air discharge limits are not exceeded. The biosparging system includes VCM monitoring at sentry wells which are located 1800 to 2400 feet upgradient of the closest Northrop Treatment System well (GP-1). If these sentry wells show VCM migration to well GP-1 at concentrations which could affect the operation of the Northrop Treatment System, sufficient time is available to select, design, and construct a VCM treatment component for the Northrop Treatment System off-gas.

Comment # 20: Why is biosparging being considered as a solution when it only addresses one of the many contaminants?

EPA Response # 20: The contaminants other than VCM are being addressed by the treatment system in operation on the Northrop facility. Because VCM from the Site has not reached that system and it system would not be effective in treating VCM, the VCM will be treated using the biosparging.

Remedy Implementation Issues

Comment # 21: If EPA decides to use the contingency of pumping and treating the VCM subplume, will the local municipalities be notified?

Response # 21: Yes. Before the contingency is implemented, EPA would notify local authorities and addressees on the Site's mailing list.

Response # 22: In the last ten years, there has been a significant amount of research in subsurface microbiology. It has been learned that these microorganisms can live as deep as 3,000 feet or more below land surface. There is evidence that at this Site there is biological activity at least to the bottom of the plume which occurs at approximately 600 ft below ground surface.

Comment # 23: There are references in the Proposed Plan for Alternative 1 that state that the Northrop Treatment System will exceed its air discharge limitations and this statement is based upon the results of computer simulations. Because of the uncertainty associated with simulated results, it is suggested that text such as "could potentially exceed its air discharge limitations without the addition of supplemental treatment capability" be used instead of the more definitive phrasing used in the Proposed Plan.

Response # 23: It is true that the predicted VCM concentrations are based on computer simulations with inherent uncertainty. However, computer simulations are considered a useful tool to predict the behavior of the aquifer and many of the statements regarding other alternatives are based on computer simulations, including the predicted behavior of the VCM subplume.

Comment # 24: The Proposed Plan states that aerobic degradation of TCE and PCE is limited. While this is true for PCE, it is not

correct for TCE. TCE degradation does readily occur under aerobic conditions, although not as quickly as occurs under anaerobic conditions. The text should be revised to reflect the different aerobic degradation rates for these two compounds.

Response # 24: It is true that TCE will more readily degrade under aerobic conditions, while PCE will not. Aerobic biodegradation of TCE requires the addition of a carbon energy source (such as methane) in addition to oxygen for degradation to proceed at adequate rates. The biosparging remedy does not include a carbon source as an initial matter. Addition of nutrients and carbon sources are possible supplements. Under the conditions of strict biosparging without the addition of a carbon source, TCE biodegradation will be limited. Appropriate sections of the ROD address the topic as follows: "aerobic conditions will not enhance the degradation of PCE but will enhance the degradation of TCE only when sufficient quantities of a suitable carbon source such as methane are present; therefore, the effect of biosparging on TCE and PCE would be limited."

Comment # 25: Because it will be necessary to sparge at extreme depths (greater than 350 feet) air will have to be forced at pressures in excess of 180 pounds per square inch (psi) to overcome the head exerted by the water column. Thus, all the wellhead assemblies must be constructed in accordance with American Society of Mechanical Engineers (ASME) code requirements for similar pressures. Wellhead retrofits may be required at existing wellheads and proper health and safety precautions should be adhered to, particularly where public access cannot be controlled.

Response # 25: The biosparging system (wellhead assemblies and retrofits, flanges, fittings and piping) will be designed for the appropriate pressures according to ASME specifications. Proper health and safety procedures will be followed, especially where public access is an issue.

Comments # 26A-26E: Several comments were made which pertained to biosparging process issues that may preclude the use of biosparging under the Site conditions as described in comments 26A-26E below:

Comment # 26A: Because of the high pressure at which the system must operate to successfully sparge to depths of 320 feet below the water table, the air is compressed when it is released into the groundwater. The pressure, upon release will be on the order of 140 to 180 psi (i.e., 10 to 13 atmospheres). At this pressure, the actual airflow will be approximately 30 standard cubic feet per minute (scfm). As the air rises and the pressure declines, the air volume will increase. This phenomenon will

lead to a reduction in aquifer permeability and a "damming-effect" (a decrease in the velocity of groundwater flow) can result. The more air forced in, the greater the effect on the permeability.

Response # 26A: The concern that large volumes of air might significantly reduce hydraulic conductivity in the formation near injection locations can be mitigated through the use of a pulsed injection strategy. It is anticipated that the cycle would consist of one day of injection (or possibly 1 or 2 hours per day) followed by a week or a month of no injections. The net result is that over the vast majority of the time, injection will not be occurring. This pulsing will allow the injected air/oxygen to dissipate and be solubilized by groundwater flowing through the formation, thereby limiting the reduction in aquifer permeability and reducing the probability of a "damming-effect."

Comment # 26B: Because the air is released under 10 atmospheres of pressure, the saturation concentration of oxygen in the water is more than 10 times that under atmospheric pressure. This high oxygen concentration will poison the bacterial population.

Response # 26B: It is possible that the bacteria in close proximity to the injection location will not survive the high oxygen content of the injected air. Short distances from the injection locations, however, dissolved oxygen concentrations are expected to decrease to levels that are not toxic to the bacteria. Thus, it is believed that any die-off would be limited to the area in the immediate proximity of the injection location. Furthermore, groundwater will continue to flow, diluting the DO concentrations and will bring "new" bacteria to the area of the injection location. die-off would be expected to be a short-term event and limited in extent. If this does occur, it may actually benefit the operation by preventing bacterial buildup around the injection well screen.

The testing to be performed during the predesign phase will be used to evaluate this potential issue.

Comment # 26C: When air is injected into the ground, it will rise along the path of least resistance to the water table. The geology at the Site is heterogeneous due to its depositional history. As a result, there are layers of variable permeability throughout the depth of the formation. This layering has some influence on groundwater flow, but has a much greater affect on airflow. This layering will lead to the preferential flow of

the air along high permeability lenses horizontally. During pilot testing, it is critical that the farthest monitoring wells be located at a minimum of twice the total injection depth to monitor this effect. In addition, the air can carry stripped VCM outward from the target groundwater zone, thus potentially spreading the VCM impacts both in the groundwater and in the vadose zone. Monitoring points should be included to track this effect and accurately define it.

Response 26C: The heterogeneous layering of the formation will be considered when developing the scope of the predesign activities. Preferential horizontal flow along high permeability lenses beneath a low permeability lens is in fact desirable as it will enhance the areal distribution of the injected air/oxygen. Also, the highly permeable zones are the pathways in which most of the groundwater flow and chemical flux occur. Thus, enhanced oxygenation in these zones is desirable.

Monitoring wells will be located from approximately 50 to 600 feet from the expected locations of the predesign injection wells. The 600-foot distance is approximately twice the depth of proposed injection wells. In addition, monitoring points for the vadose zone will be installed.

Comment # 26D: VCM is a very volatile organic compound. At the proposed rates of air injection, stripping of the VCM from groundwater will occur and could represent the chief mechanism of mass removal. Monitoring points should be added to track this effect and accurately define it. In addition, lower airflow rates should be tested to try to minimize this effect.

Response # 26D: It is again noted that the air/oxygen injection will be pulsed and will not be continuous. Therefore, stripping would be minimized and would be monitored.

Comment # 26E: The proposed rate of injection of 300 scfm is higher than typical biosparge applications, which will exacerbate all the negative potential effects described above. At a minimum, lower rates should be tested and the proposed rate of 300 scfm should be reconsidered.

Response # 26E: Pulsing was selected to enhance solubilization of the injected air/oxygen and reduce/eliminate air stripping and the potential detrimental impacts of VCM migration to the vadose zone.

The results of the predesign activities will be used to determine the appropriate air/oxygen injection rate and

period/volume required to reduce the stripping of VCM from the groundwater.

Comment # 27: The FS evaluation and cost projections summarized in the Proposed Plan do not account for some of the biosparging process issues described above (in Comments 26A-26E). There are ways to overcome some of these issues (such as the use of blended gases - air plus nitrogen for example - to control the concentration of dissolved oxygen that can enter the groundwater) but at higher cost. Such considerations should be included in the cost comparison. At a minimum, these issues and costs must be included in the pilot test program and in the subsequent data evaluation and full-scale design and costing.

Response # 27: The issues identified are appropriate to consider at the detailed design and pilot testing phases and are not necessary to the evaluation of alternatives in the FS and Proposed Plan. In addition, the cost estimates presented in the Proposed Plan and the ROD contain a 20 percent contingency to account for issues such as those cited in the preceding comment. One purpose of the predesign activities is to determine the design and operating parameters of the full-scale biosparging system (e.g., spacing/number of injection wells needed).

The test results will be used to refine the cost estimates for the full-scale biosparging system. Other issues identified by the testing which were not specifically included in the Proposed Plan cost estimates will also be included in the cost estimate for the full scale system.

Comment # 28: The Proposed Plan includes a contingency for the addition of nitrogen and phosphorous to supplement the aerobic biodegradation of VCM in the groundwater. Given the fact that the groundwater is used for drinking water supplies in the area, the application of nutrients will require extensive permitting and monitoring.

Response # 28: EPA agrees that the application of nutrients would be monitored closely. Such additions would be designed such that the nutrients are completely utilized within a defined treatment zone. Permits would not be required because the remedial action is being conducted under CERCLA, but the substantive requirements of appropriate permits would need to be met. Initially, it is not planned to add nutrients to the biosparging system. The intent is to attempt to use injected air/oxygen only. The predesign testing will help determine whether any nutrient addition is necessary.

The amount of nutrients added, if any, will be limited to that amount estimated to be consumed during the biosparging process. Furthermore, the concentration of any nutrients added will be less than the drinking water standards and will be consumed before reaching the Northrop wells. In addition, monitoring for such nutrients, if utilized, will be performed.

Comment # 29: What is the time frame for the project?

Response # 29: After the ROD is issued, EPA will enter into a period of negotiations for several months with the Potentially Responsible Parties ("PRPs") in a attempt to secure performance of the selected remedy. The remedial design will take approximately one year to complete. The remedy should then take an additional six to eight months to be constructed.

Miscellaneous

Comment # 30: The Proposed Plan states that "...available data indicate that several public supply wells from the Bethpage Water District have been affected by VOCs which are likely attributed to all three sites." One commenter stated that the chemicals, however, could not have impacted the Bethpage public supply wells because the Hooker/Ruco VOC chemicals have not reached wells which are located upgradient of those public supply wells.

Response # 30: While it is true that VCM has not reached these public supply wells, other VOC's such as TCE and PCE have been detected in wells between the Hooker/Ruco Facility and these public supply wells. The intent of the sentence was to communicate that there is a regional commingled VOC plume. For clarification the sentence has been worded in the appropriate section of the ROD as follows: "Available data indicate that several public supply wells from the Bethpage Water District have been affected by VOCs attributable to the commingled plume emanating from the three sites."

Comment # 31: A typographical error was identified in the Comparison of Alternatives Section of the Proposed Plan where the word "not" had been mistakenly omitted.

Response # 31: The text has been changed appropriately in the ROD, which reads "[b]oth Alternatives 2 and 3 would reduce the concentration of the VCM subplume to the level that supplemental treatment for VCM at the Northrop Treatment System would not be required.

Comment # 32: In estimating present worth costs a discount factor of 5 percent is used in one section of the Proposed Plan and a value of 7 percent is used in another section.

Response # 32: The appropriate text of the ROD has been changed to reflect that the 7 percent discount rate is used consistently.

Comment # 33: What products are made from vinyl chloride? What
products are made at the plant located at the Hooker/Ruco Facility?

Response # 33: Vinyl chloride is a manufactured substance that is used to make polyvinyl chloride (PVC). PVC is used to make a variety of plastic products, including pipes and wire and cable coatings. These products were never made at the plant. The plant is currently used for the production of various polymers, PVC, styrene/butadiene latex, vinyl chloride/vinyl acetate copolymer, and polyurethane, as well as ester plasticizers.

Comment # 34: Does biosparging have a proven track record?

Response # 34: While biosparging is a relatively new technology, it is being used successfully at a number of other Superfund sites, such as Eielson Air Force Base, Alaska; Oralaska Municipal Landfill, Wisconsin; and Applied Environmental Services, New York.

Comment # 35: The Proposed Plan recognizes that a portion of the VOC plume originating from the Site is not addressed by the proposed remedy, but has been and continues to be treated by the downgradient Northrop treatment system and the VOC removal system for VOC-impacted public supply wells funded by Northrop and the U.S Navy. Hence, Occidental Chemical Corporation (Occidental) should share the costs for these other treatment systems as well as the long-term operation and maintenance (O&M). Therefore, Occidental's share of these costs should be addressed in the consent order to be issued to Occidental for the Remedial Design/Remedial Action (RD/RA) phase of the project.

Response # 35: The commingled regional VOC plume is not directly addressed by the selected remedy. However, EPA's ROD acknowledges that the groundwater in the region has been contaminated by three sites: the Hooker/Ruco Facility, the NWIRP site, and the Northrop site and the ROD relies on the continued operation of the IRMs, together with the remedy EPA is selecting in the ROD, to ensure restoration of the aquifer. EPA and NYSDEC agreed to undertake a coordinated effort to address the commingled groundwater plume. This approach acknowledges that there are both administrative and practical considerations behind the division of responsibility for components of the remedial work so as to avoid duplication of

effort and the resulting expense to all parties involved. As such, the primary focus of EPA's and the State's remedies will target different facilities and different contaminants, though some overlap may be inevitable; when conducted together, these components will form a comprehensive remedy for the cleanup of the regional groundwater plume.

Following the issuance of the ROD, EPA will ascertain whether Occidental and Ruco Polymer Corp. are willing to enter into a Consent Decree pursuant to CERCLA for the RD/RA of the selected remedy. The selected remedy does not involve construction of the IRMs, as they were already constructed pursuant to NYSDEC's agreements with the PRPs for the Northrop and NWIRP sites. These treatment systems, which were early, interim actions for these sites will become part of the State's selected remedy for those sites. In addition, the long-term operation of the IRMs will be managed as part of the remedies for these State-lead sites.

The PRPs involved with the three sites can negotiate a private agreement concerning their respective shares of the expenses associated with the IRMs.

Comment # 36: Figure H.2.8 of the RI Report shows that rainwater inside the study area would run into the Hicksville water wells at plant 9.

Response # 36: Figure H.2.8 depicts the lines of hydraulic head for a layer of the study area. The study area depicted on Figure H.2.8 includes an area larger than the area impacted by the Site. The groundwater flows perpendicular to the lines of equal head from the higher numbers to the lower. This shows the groundwater generally flows to the south. The influence of pumping wells, including the Hicksville wells, is also shown. The figure shows that the influence of the Hicksville wells does not extend to the Site.

Comment # 37: There were two dates for the public meeting given in mailings. Should another meeting be scheduled?

Response # 37: On July 28, 2000, an advertisement was placed in Newsday announcing the issuance of the Proposed Plan and that a public meeting would be held on August 15th to discuss the Site. EPA also sent notices to people on the Hooker/Ruco Site mailing list. Due to a clerical error, the date for the public meeting was incorrect on the mailing. The error was detected and an additional mailing was sent to the same mailing list the next day. The meeting was well attended. Therefore, EPA does not believe an additional meeting was warranted.

RESPONSIVENESS SUMMARY

Appendix A

Proposed Plan

Hooker Chemical/Ruco Polymer Site

Hicksville, Nassau County, New York

\$EPA

July 2000





MARK YOUR CALENDAR

July 28 through August 28, 2000: Public comment period on the Proposed Plan.

August 15, 2000 at 7:00 PM:
Public meeting at the Oyster Bay
Town Hall (Town Board Hearing
Room) 54 Audrey Avenue,
Oyster Bay, NY 11771

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COMMUNITY ROLE IN SELECTION PROCESS

EPA and NYSDEC rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the Hooker Ruco Remedial Investigation and Feasibility Study (R!/FS) and other investigative reports along with this Proposed Plan have been made available to the public for a public comment period which begins on July 28, 2000 and concludes on August 28, 2000.

A public meeting will be held during the public comment period at the Oyster Bay Town Hall (Town Board Hearing Room) 54 Audrey Avenue, Oyster Bay, NY 11771 on August 15, 2000 at 7:00. PM to present the conclusions of the RI/FS, to discuss the preferred remedy, and to receive public comments on the preferred remedy.

Comments received at the public meeting, as well as written comments, will be documented in the Responsive-

PURPOSE OF PROPOSED PLAN

This Proposed Plan describes the remedial alternatives considered for contaminated groundwater at the Hooker Chemical/Ruco Polymer Site (Site), and identifies the preferred remedial alternative with the rationale for this preference. The Proposed Plan was developed by the U.S. Environmental Protection Agency (EPA) in consultation with the New York State Department of Environmental Conservation (NYSDEC). The preferred remedial alternative proposed in this plan would protect human health and the environment from risks associated with the contaminated groundwater at the Site.

This Proposed Plan is being provided as a supplement to the Remedial Investigation and Feasibility Study (RI/FS) reports to inform the public of EPA and NYSDEC's preferred remedy and to solicit public comments pertaining to all the remedial alternatives evaluated, including the preferred alternative. Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended, and Section 300.430(f) of the National Oil & Hazardous Substance Pollution Contingency Plan (NCP) require EPA to solicit public comments on proposed plans. The alternatives summarized here are more fully described in the FS report contained in the Administrative Record file for the Site.

EPA's preferred remedy involves the use of an innovative in-situ treatment technology (biosparging) to remediate a localized vinyl chloride monomer (VCM) plume of groundwater contamination which originated from the Site. EPA and NYSDEC recognize that an existing groundwater extraction and treatment system which is operating as an Interim Remedial Measure (IRM) at the downgradient Northrop/Grumman Aerospace Corporation Site (Northrop) is containing and remediating a commingled plume of groundwater contamination from the Northrop, Naval Weapons Industrial Reserve Plant (NWIRP) and the Hooker/Ruco Facility sites. EPA's preferred remedy together with this existing treatment system will protect the downgradient users against the migration of groundwater contamination present in the aquifer. If it is determined that biosparging would not be effective in reducing the VCM contamination in a reasonable time frame, then groundwater extraction and treatment would be implemented as a contingency remedy.

This Proposed Plan also presents a change to the groundwater component of the 1994 Record of Decision (ROD) for the first operable unit (OU-1) at the Site because the Northrop IRM and the proposed remedy together would obviate the need to perform any additional groundwater action selected in the OU-1 ROD.

The remedy described in this Proposed Plan is the *preferred* remedy for the Site. Changes to the preferred remedy or a change from the preferred remedy to another remedy may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after EPA has taken into consideration all public comments. EPA is soliciting public comment on all of the alternatives considered in the FS report because EPA and NYSDEC may select a remedy other than the preferred remedy.

ness Summary section of the Record of Decision (ROD), the document which formalizes the selection of the remedy.

The administrative record file, which contains the information upon which the selection of the response action will be based, is available at the following locations:

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Hicksville Public Library 169 Jerusalem Avenue Hicksville, NY 11801 (516) 931-1417

Contact Reference Desk

Hours: Monday-Thursday Friday Saturday

9 AM - 9 PM 9 AM - 5 PM 9 AM - 5 PM

USEPA-Region II
Superfund Records Center
290 Broadway, 18th Floor
New York, NY 10007-1866
(212) 637-4308

Hours: Monday-Friday, 9:00 AM - 5:00 PM

Written comments on this Proposed Plan should be addressed to:

Syed M. Quadri
Project Manager
New York Remediation Branch
Emergency and Remedial Response Division
United States Environmental Protection Agency
290 Broadway, 20th Floor
New York, NY 10007-1866

Telefax: (212) 637-4284 Internet: quadri.syed @epamail.epa.gov

SCOPE AND ROLE OF ACTION

Site remediation activities are sometimes segregated into different phases, or operable units (OUs), so that remediation of different environmental media or areas of a site can proceed separately, resulting in an expeditious remediation of the entire site. EPA has designated three operable units for the Site. Operable Unit 1 (OU-1) addresses contaminated soils at the Hooker/Ruco Facility. Operable Unit 2 (OU-2) addresses polychlorinated biphenyl (PCB) contaminated surface soils. Operable Unit 3 (OU-3), which is the subject of this Proposed Plan, addresses the downgradient commingled contaminated groundwater plume beyond the Hooker/Ruco Facility and also the contaminated groundwater beneath the Hooker/Ruco Facility which was previously included under OU-1.

The primary objectives of the comprehensive remedial action described in this Proposed Plan are to reduce contaminant levels in groundwater, to minimize the migration of contaminants and to protect human health and the environment from risks associated with the contaminated groundwater.

SITE BACKGROUND

Site Description

The Hooker/Ruco Facility (refer to Figure 1) is an active chemical manufacturing facility located in Hicksville, Long Island, New York. The area surrounding the Hooker/Ruco Facility is comprised of an industrial corridor and residential complexes. The Hooker/Ruco Facility currently contains four buildings used for the manufacture and storage of chemical products and an administration building. The remainder of the 14-acre property contains parking areas, chemical storage tanks, recharge basins (sumps) and small ancillary structures. The Hooker/Ruco Facility currently employs about 100 individuals and manufactures polyester, polyols, and powder coating resins.

Site History

Operations at the Hooker/Ruco Facility began in 1945 and included natural rubber latex storage, concentrating, and compounding. These activities were expanded and modified through the years to include production of plasticisers and polyvinyl chloride (PVC). The Hooker/Ruco Facility was owned and/or operated by several companies including the Rubber Corporation of America, the Hooker Chemical Company (currently known as the Occidental Chemical Corporation or Oxy) and the Ruco Polymer Corporation (Ruco Polymer). In 1998, Sybron Chemicals Inc. acquired Ruco Polymer.

During operations between 1951 and 1975, industrial wastewater and storm water from the Hooker/Ruco Facility was discharged to on-Site recharge basins or sumps (sumps 1, 2, 3, 4, 5 & 6). This wastewater contained among other things, vinyl chloride, trichloroethylene (TCE), barium and cadmium soap, vinyl acetate, organic acids and styrene condensate. After 1975, the waste stream was incinerated on the Hooker/Ruco Facility. Sump 1 continued to receive discharge from the floor drains in part of the plant until 1976. As a result of these releases, the groundwater beneath and downgradient of the Hooker/Ruco Facility has been contaminated.

The Hooker Chemical/Ruco Polymer Site was placed on the National Priorities List in 1986. In September 1988, Oxy agreed to perform an RI/FS to determine the nature and extent of contamination at the Hooker/Ruco Facility. The study identified an area of PCB contamination in the surface soils surrounding the plant. In September 1990, EPA signed a Record of Decision (ROD) to address the PCB-contaminated soil. Under an Unilateral Administrative Order (UAO), Oxy conducted the action specified in the ROD under EPA's oversight. A total of approximately 3,200 tons of PCB-contaminated soils with concentration ranging between 10-500 parts per million (ppm) were excavated and sent to an off-Site landfill. In addition, 85.2 tons of soils with PCB concentrations greater than 500 ppm were excavated and sent to an off-Site incinerator. This action was completed in December 1992.

In January 1994, also based on the results of the RI/FS completed in December 1992, EPA issued a second ROD which called for additional soil sampling, excavation of shallow soils in limited areas and soil flushing with extraction and treatment of contaminated groundwater beneath the Hooker/Ruco Facility.

In April 1994, under EPA's direction, Oxy initiated a program to investigate groundwater conditions beyond the Hooker/Ruco Facility which involved collecting additional groundwater data around and primarily west of the Hooker/Ruco Facility. The activities were described in the document entitled "Work Plan for Groundwater Investigations Beyond the Hooker/Ruco Facility, August 1994" and in a subsequent Addendum, dated September 1995.

Since the groundwater contamination associated with the Hooker/Ruco Facility has commingled with groundwater contamination from the Northrop and NWIRP sites, in the Spring of 1995, EPA and NYSDEC agreed to proceed with a coordinated effort to evaluate and develop remedial alternatives to address the commingled plume.

Coordinated Groundwater Investigation

EPA and NYSDEC have identified that the regional groundwater aguifer in the area downgradient of the Hooker/Ruco Facility has also been contaminated by two adjacent sites, Northrop and the NWIRP. These two facilities are designated as NYSDEC hazardous waste sites. Northrop is a potentially responsible party (PRP) for the Northrop site and the National Division Naval Facilities Engineering Command (the U.S. Navy) is the PRP for the NWIRP site (see Figure 2). Northrop has signed a Consent Order and the US Navy has signed a Memorandum of Understanding for their respective facilities with NYSDEC for the performance of an RI/FS. The RIs for the Northrop and NWIRP sites were completed in September 1994 and October 1993, respectively. Based on the findings of these reports, Northrop and the U.S. Navy have implemented two groundwater IRMs. One measure provides for VOC removal treatment at the Bethpage Water District wells downgradient of the Northrop/NWIRP sites. The second pumping and treatment of measure consists of groundwater from four wells (GP-1, ONCT-1,2 &3) at the

The Northrop/Grumman Site (Northrop)

The Northrop/Grumman Site (formerly Grumman Aerospace Corporation) was initially more than 600 acres in area. However, as a result of several remedial activities taken at the site, NYSDEC has reclassified some portions of the site to Class 4 and delisted other portions of the site on the New York State Registry of Inactive Hazardous Waste Disposal Sites

The Northrop plant was established in the early 1930's and developed and manufactured a series of naval carrier aircraft, amphibious vehicles and space exploration vehicles. The plant is presently undergoing closure operations. The facility included numerous buildings, 7 industrial production wells and four recharge basin areas. The main activities of this facility have been the engineering, manufacturing, primary assembly, and research and development testing of a variety of military and aerospace crafts. The recharge basins located in the southern end of the property received treated industrial wastewater from the late 1940's until 1981. Since 1981, the treated wastewaters have been discharged to a sanitary sewer and the recharge basins have been used to discharge only non-contact cooling water and storm water runoff. Discharges to the on-site recharge basins are regulated in accordance with a State Pollutant Discharge Elimination System (SPDES) permit. Between 1996 and 1998, a soil vapor extraction (SVE) system was operating at Plant 2 of the Northrop Site for soil remediation.

Naval Weapons Industrial Reserve Plant (NWIRP)

The NWIRP facility was established on the Northrop property during the early 1930's. Historically, this was a government-owned and contractor-operated facility with the mission of design engineering, research prototyping, testing, fabrication and primary and subassembly of various naval aircraft. The facility included seven industrial production wells and one recharge basin. Several waste source areas were identified at the site during the RI/FS which was conducted from 1991 to 1995. Currently, air sparging and SVE systems are being operated at the NWIRP Site for soil remediation.

Northrop Facility and includes a long-term groundwater monitoring program.

While EPA and NYSDEC have conducted independent investigations of the source areas at each of the three sites, the Agency and the State have coordinated the investigation of the regional groundwater contamination to avoid duplication of effort. The regional groundwater contains volatile organic compounds (VOC) contaminants which are related to past waste disposal at each of the facilities and which have commingled. Based on the available data, the Northrop, NWIRP and Ruco Facilities are sources of TCE, perchloroethylene (PCE), vinyl chloride monomer (VCM), semivolatile organic compounds (SVOCs) and inorganics. The main source of VCM, however, is attributed to historic wastewater discharges

from the Site. In the Spring of 1995, EPA and NYSDEC agreed to proceed with a coordinated effort to evaluate and evelop remedial alternatives to address the commingled plume. Upon further agreement in November 1998, EPA directed Oxy to prepare an FS which addressed the VCM subplume within the regional groundwater plume and NYSDEC directed Northrop and NWIRP to prepare an FS to address the remainder of the regional VOC groundwater It is noted that the decision to approach plume. remediation of the regional plume in this manner was based on administrative and not technical considerations. In the summer of 2000, NYSDEC intends to issue a Proposed Plan which, in addition to addressing the regional groundwater contamination, will identify source control measures for the Northrop and NWIRP Facilities.

Regional Hydrogeology

The subsurface conditions beneath the area generally consist of a shallow Upper Glacial aquifer and a deeper Mayothy aquifer. The Upper Glacial aquifer consists of glacial out wash sand and gravel deposits that range in thickness from approximately 30 ft to 75 ft. The Magothy aquifer consists of a heterogeneous deposit of sand and gravel interbedded with discontinuous lenses of silty to solid clay. The Magothy aquifer is approximately 600 ft to 650 ft in thickness. A 175-foot thick clay deposit underlies the Magothy aquifer and is considered to represent the lower impermeable boundary of the groundwater flow system. Within the vicinity of the Site, the Magothy aguifer is the primary source of water for municipal and industrial usage. Groundwater flow in the Upper Glacial and Magothy aquifers in the vicinity of the three sites generally occurs from north to south. The aquifers are sustained primarily by precipitation recharge, storm water runoff and industrial water discharge to recharge basins or sumps. Downward vertical gradients from the Upper Glacial aquifer to the Magothy aquifer are predominant over upward vertical gradients. Groundwater flow directions are influenced significantly by the localized effects of municipal and industrial pumping centers and recharge basins.

REMEDIAL INVESTIGATION SUMMARY

The groundwater sampling and analyses conducted as part of the RIs for the Northrop, NWIRP and Ruco Facilities indicated that past activities at each of the sites have resulted in the contamination of groundwater resources within the Upper Glacial aquifer and Magothy aquifer. Sampling demonstrated that the groundwater beneath the Site, specifically underlying the south eastern portion of the Site, and the Northrop and NWIRP sites, contains chemical constituents above the New York State (NYS) drinking water standards, NYS groundwater quality standards and EPA maximum contaminant levels (MCLs). The NYSDEC and EPA have determined that the primary groundwater contaminants of concern in the region of the three sites are

volatile organic compounds (VOCs), primarily TCE, PCE and VCM. The secondary contaminants are SVOCs and inorganics and are associated with the three sites as noted below:

- Hooker/Ruco: tentatively identified compounds referred to as TICs (including glycols and acids) and metals;
- 2) Northrop: inorganics including arsenic, cadmium, and chromium; and
- 3) NWIRP: SVOCs including:
 bis[2-ethylhexyl]phthalate,
 di-n-butylphthalate, di-n-octylphthalate,
 2-methylphenol, 4-methylphenol,
 2,4-dimethylphenol, naphthalene,
 acenaphthylene, fluoranthene,
 benzo[b]fluoranthene, pyrene arid TICs
 including polyaromatic hydrocarbons,
 substituted benzenes, alkanes,
 substituted phenols, and carboxylic
 acids; and inorganics including @dmium,
 chromium, and thallium.

The most prevalent VOCs and their corresponding maximum concentrations detected in the groundwater in the vicinity of the sites were TCE at a concentration of 58,000 parts per billion (ppb) at NWIRP (Figure 4.9 of Final Remedial Investigation Report, NWIRP, May 1992); 25,000 ppb at the Northrop facility; and 1100 ppb at the Site. The highest concentrations of PCE detected were 490 ppb at the Northrop site and 350 ppb at the Site. Similarly, the highest concentrations of VCM detected were 6,400 ppb at the Site in the area of monitoring well 52 (MW-52 area) and 550 ppb at Northrop. The highest concentrations of total SVOCs and VOC TICs detected at the Site were 4200 ppb and 493 ppb, respectively. Individual TICs concentrations ranging from 2 ppb to 800 ppb were detected in two of the wells located at the downgradient boundary of the Site. In addition, antimony and arsenic were detected at the Site at concentrations as high as 22 ppb and 83 ppb, respectively. Please refer to the Hooker/Ruco RI/FS Reports for OU-1(August 1992) and OU-3 (July 2000) and the Northrop RI/FS reports for a detailed evaluation of the analytical results obtained to date for the three sites. Based on the computer generated groundwater plume modeling maps developed as part of the Northrop Ri Report (prepared by Geraghty and Miller (G&M) in 1994 and the report entitled "Regional Groundwater Feasibility Study," prepared by G&M in March 1998), VOC-impacted groundwater beneath and downgradient of each of the three sites is estimated to be approximately 12,100 feet long (along its north-south axis) 9,600 feet wide (along its east-west axis) and 580 feet deep (at its deepest point). The Northrop FS addresses this plume in detail. Similarly, using G&M's computer generated groundwater plume modelling (see Appendix A of Ruco FS, July 2000), the area of the VCM subplume is

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estimated to be 2000 feet long (at its longest point), by 1350 feet wide (at its widest point), by 430 feet deep.

In general, the regional direction of shallow horizontal groundwater flow is to the south/southeast away from the sites. Because of the direction of groundwater flow, the fact that a total of 14 production wells at these sites have historically pumped as high as 12 to 14 million gallons a day and that recharge occurs at the Northrop and NWIRP sites, much of the VOC-impacted groundwater from all three sites has been drawn onto and/or beneath the Northrop and NWIRP sites. However, because the degree of hydraulic containment obtained from the production wells was not 100 percent, some of the VOC-impacted groundwater has migrated downgradient. In addition, available data indicate that several public supply wells from the Bethpage Water District have been affected by VOCs which are likely attributed to all three sites. These supply wells, however, have been equipped with VOC treatment units provided by Northrop and NWIRP. The water fed to these distribution systems continues to meet all New York State and Federal drinking water standards. Currently, there are no private drinking water supply wells in the residential areas surrounding the sites. A Nassau County ordinance permits obtaining drinking water only from a public supply source. The public water supply is obtained from the sole source groundwater aquifer.

SUMMARY OF SITE RISKS

Based upon the results of the RI at the Site, EPA conducted a baseline risk assessment to estimate the potential risks associated with current and future exposure to Site contaminants. Since this operable unit is focused on groundwater, the baseline assessment estimates the human health and ecological risk which could result from exposure to the contaminated groundwater at the Site, if no remedial actions were taken. The box entitled "What Is Risk and How Is It Calculated?" describes the four-step process used to calculate potential carcinogenic risks and noncarcinogenic human health effects for the Site.

Human Health Risk Assessment

The Hooker/Ruco Facility is currently zoned industrial with residential neighborhoods in close proximity. Currently, there are no known private drinking water wells on the Hooker/Ruco Facility or in the adjacent residential areas surrounding the Hooker/Ruco Facility. The future use of the Hooker/Ruco Facility was assumed to remain industrial. However, a resident was assumed to live at the downgradient property line and use the sole source aquifer as a water supply. Therefore, the baseline risk assessment focused on potential future health effects for both adults and children, in a residential setting, that could result from future exposure to groundwater via ingestion, inhalation, and dermal contact.

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance exposure from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the contaminants of concern (COC) at the site in various media (i.e., soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil. Factors relating to the exposure assessment include, but are not limited to, the concentrations that people might be exposed to and the potential frequency and duration of exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health effects, such as changes in the normal functions of organs within the body (e.g., changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health effects.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10⁻⁴ cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions explained in the Exposure Assessment. Current Superfund guidelines for acceptable exposures are an individual lifetime excess cancer risk in the range of 10⁻⁴ to 10⁻⁶ (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk) with 10⁵ being the point of departure. For non-cancer health effects, a "hazard index" (HI) is calculated. An HI represents the sum of the individual exposure levels compared to their corresponding reference doses. The key concept for a non-cancer HI is that a "threshold level" (measured as an HI of less than 1) exists below which noncancer health effects are not expected to occur.

The contaminants of concern in the groundwater at the Site include metals and VOCs such as vinyl chloride, etrachloroethene, arsenic, antimony, and bis(2-ethylhexyl) phthalate. Of these chemicals, arsenic and VCM are classified as Class A carcinogens (known to cause cancer in humans).

For known or suspected carcinogens, EPA has established an acceptable cancer risk range of one- in-a-million (1 x 10 b) to one-in-ten-thousand (1 x 10 d). Action is generally warranted when excess lifetime cancer risk exceeds one-in-ten-thousand. In other words, for every 10,000 people that could be exposed, one extra cancer *may* occur as a result of exposure to site contaminants (i.e., one more person could develop cancer than would normally be expected from all other causes).

The results of the baseline risk assessment indicated that the current use of groundwater at the Site does not pose a risk to human health since no one uses the groundwater for domestic purposes. The ruture residential groundwater use scenario showed unacceptable risks to human health. Future groundwater ingestion exposures yielded carcinogenic risks to adults of 2.2 x 10⁻³ and 8.8 x 10⁻⁴ for children. The groundwater inhalation exposure to adult residents in the future use scenario results in a potential carcinogenic risk of 5.0 x 10⁻⁴. Tables C-1 and C-2 of the Risk Assessment and Table 2.1 of the Ruco FS Report (July 2000) show that the majority of the carcinogenic risk (65 to 99 percent) can be attributed to potential exposure to VCM.

The groundwater risk calculations were prepared using the data set from the Hooker/Ruco OU-1 RI (August 1992) which revealed a maximum VCM concentration of 560 ug/l. More recent groundwater sampling has shown higher VCM concentrations with a maximum value of 6,400 ug/l. These higher VCM concentrations would produce carcinogenic risk estimates greater than those listed above.

In conclusion, EPA has determined that the preferred alternative or another active remedial alternative identified in this Proposed Plan, is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Ecological Risks

The Hooker/Ruco Facility is fully developed as an industrial facility and is surrounded by industrial and residential properties. There are no natural surface water bodies, wetlands, or sensitive flora or fauna within the Site. The contaminants of concern are located in the groundwater starting at a depth of approximately 50 feet below ground surface. A screening evaluation of ecological risk was conducted as part of the RI. Therefore, EPA has determined that the contaminants of concern present at the Site poses no ecological risks.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), site-specific risk-based levels and the most reasonably anticipated future land use for the site i.e., industrial/commercial use.

The following remedial action objectives were established for the Site:

- Protect human health from exposure (via ingestion, inhalation, and dermal contact) to VCM, TCE, PCE and TICs in groundwater at concentrations in excess of New York State groundwater standards and Federal MCLs.
- 2. Restore the aquifer to meet New York State Groundwater Standards and New York State and Federal MCLs in a timely manner. If the aquifer cannot be restored to meet standards, then, minimize further migration of VCM, TCE, PCE and TICs to prevent adverse impact on downgradient public and private users."

Summary of Remedial Alternatives

CERCLA requires that each selected remedy be protective of human health and the environment, be cost-effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

The remedial approach for the contaminated groundwater originating from the Site is designed to primarily address the VCM subplume. This approach will provide supplemental treatment for the existing treatment system that is operated by Northrop as an IRM. EPA recognizes that this treatment system, as it is currently designed, would be unable to treat the VCM subplume without the system exceeding it air discharge limitations. The plume is comprised of commingled contamination originating from the Site and the Northrop and NWIRP sites. This treatment system is expected to require more than 30 years of operation to restore the aquifer to meet drinking water standards.

The remedial alternatives developed to address the VCM subplume at the Site are presented in detail below.

The construction time for each alternative reflects only the time required to construct or implement the remedy and the time required to design the remedy, negotiate its performance by the parties responsible for the contamination, or procure contracts for design and construction.

SUMMARY OF GROUNDWATER REMEDIATION ALTERNATIVES

ALTERNATIVE 1: NO-FURTHER ACTION

Capital Cost: \$0
Annual Monitoring Cost: \$6000
Construction Time: N/A

30-Year Present Worth Monitoring

Cost (7% discount factor): \$74,000

The Superfund program requires that the "No-Action" Alternative be considered as a baseline level to which other remedial technologies and alternatives can be compared.

The No-Further Action Alternative does not include any remedial measures to address the contamination at the Site. It is recognized, however, that the regional VOC plume is being addressed by the extraction and treatment of contaminated groundwater at the Northrop Facility which has been demonstrated to contain and prevent further migration of the regional plume.

Because this alternative would result in elevated concentrations of VCM contamination remaining at the Site above health-based levels, CERCLA requires that the remedy be reviewed every five years to evaluate groundwater conditions.

This alternative would include a long-term groundwater monitoring program. Under this monitoring program, groundwater samples would be collected and analyzed semi-annually.

The No-Further Action Alternative would also include the development and implementation of a public awareness and education program for the residents in the area surrounding the Site. This program would include the preparation and distribution of informational press releases and circulars and convening public meetings. These activities would serve to enhance the public's knowledge of the conditions at the Site.

ALTERNATIVE 2: VCM SUBPLUME EXTRACTION, TREATMENT AND DISCHARGE TO ACHIEVE GROUNDWATER ARARS

Capital Cost: \$ 4,195,000 Annual O&M Cost: \$ 722,000 Construction Time:

12-18 Months

Present worth cost (operating period of 30 years at a discount factor of 7%):

\$13,200,000

Alternative 2 involves extraction and treatment of groundwater within the area of the VCM subplume with a goal of restoring the water quality of the aquifer to State drinking water standards or Federal MCLs. The State drinking water standard and EPA's MCL for VCM is 2 ppb. The treatment system would be built at the southwest corner of the Site. Conceptually, one extraction well would be placed approximately 500 feet downgradient of the MW-52 area (where current VCM concentrations exceed 1000 ppb) with two additional wells located 1000 feet downgradient of the MW-52 area (where current VCM concentrations range between 10 and 100 ppb). The exact locations of the extraction wells will be determined during remedial design. The three extraction wells were estimated to pump at a combined flow rate of 1000 gallons per minute. The effluent from the treatment system would be discharged to recharge basins on the Site. Based on the hydrogeologic modelling presented in Appendix A of the FS, it is projected that the VCM concentrations in the VCM subplume would be reduced to levels below the MCL of 2 ppb in approximately 30 years. By containing and treating the VCM within the VCM subplume, supplemental VCM treatment would not be required at the downgradient treatment system which Northrop and the U.S. Navy are operating as an IRM.

Alternative 2 recognizes that the regional VOC plume is captured by the groundwater extraction and treatment at the Northrop Facility which is preventing its further migration beyond the Northrop IRM. This system is expected to operate for the next 30 years. Alternative 2 also acknowledges the VOC removal treatment at the Bethpage Water District municipal wells.

A long-term sampling program would be developed to monitor groundwater quality in the area of the VCM subplume. New monitoring wells would be added to the existing network of monitoring wells to increase the network's area of coverage. The objective of the long-term monitoring program would be to evaluate the effectiveness of the groundwater extraction and treatment remedy and to detect if VCM is migrating southward beyond the VCM source control wells at concentrations which may require supplemental VCM treatment at the Northrop IRM.

If the long-term monitoring program identifies the migration of the VCM subplume farther southward of the Site beyond the VCM source control wells at concentrations which may require supplemental VCM treatment at the Northrop IRM, additional extraction and treatment wells at the Site may be required.

ALTERNATIVE 3: IN SITU TREATMENT OF VCM SUBPLUME BY BIOREMEDIATION USING BIOSPARGING (PLUS SUPPLEMENTAL NUTRIENT ADDITION, IF DEEMED NECESSARY)

Capital cost:\$1,260,000O&M costs (per year):\$319,000Construction Time:6-8 Months

Present worth cost for 10 years of

biosparging and 2 years of nutrient addition

(using a discount factor of 7%): \$3,800,000

This alternative utilizes in-situ biosparging technology to treat the VCM subplume. Biosparging is a form of bioremediation and involves the introduction of air/oxygen into the aquifer to increase the dissolved oxygen content in the aquifer, which would enhance aerobic degradation of VCM. This alternative is designed to remove and reduce the concentration of VCM to a level whereby supplemental treatment for VCM at the groundwater extraction and treatment system at the Northrop IRM is not required. Aerobic conditions in the aquifer would result in an increased microbial population which would also enhance the degradation of TICs. Aerobic conditions would not typically enhance the degradation of TCE and PCE, therefore the effect of biosparging on TCE and PCE would be limited.

If deemed necessary, this alternative would also utilize a supplemental bioremediation technology following the biosparging treatment. Supplemental bioremediation would involve the injection of nutrients (potentially including nitrogen and phosphorus along with suitable carbon sources such as methane) to enhance the growth and metabolic activities of indigenous microbial populations to effect the degradation of VCM in the aquifer. The addition of nutrients to stimulate the microbial population would also enhance the degradation of TCE, PCE and TICs. It is estimated that the nutrient addition would occur over a two-year period to effectively enhance the degradation of the VOCs. The exact nutrient requirement is dependent on the presence of other constituents in groundwater, and would be determined by treatability studies.

Conceptually, twelve injection wells would be installed in the area of VCM subplume to a depth of 200 to 400 feet below ground water using common drilling techniques. Additives (air/oxygen, nutrients) could be forced into the formation using either static head within the well or using pump supplied pressure. Increasing or decreasing the number of air/oxygen and nutrient injection locations, and the rate of injection, would also affect the duration. Periodic injections (monthly, bimonthly, quarterly) are suitable for biosparging. The exact locations of the injection wells and the treatment scenario would be determined after conducting appropriate pilot studies during remedial design. Although in-situ biosparging has been used effectively at other sites, because it is considered an innovative

technology, the performance criteria which would measure the effectiveness of this technology at the Site would also need to be developed during remedial design.

Similar to Alternative 2, to ensure that the regional groundwater plume is adequately addressed, Alternative 3 also relies on the ongoing and anticipated long-term operation of the groundwater extraction and treatment system at the Northrop facility and treatment at the Bethpage Water District wells.

Alternative 3 also would include the same long-term monitoring program described for Alternative 2. Similarly, Alternative 3 also acknowledges the possible need to expand the biosparging system to ensure that the Northrop treatment system will meet its air discharge limitations for vinyl chloride.

EVALUATION OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria, namely overall protection of human health and the environment; compliance with applicable or relevant and appropriate requirements, long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; short-term effectiveness; implementability; cost; and NYSDEC and community acceptance. The evaluation criteria are described below.

- •Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
- •Compliance with applicable or relevant and appropriate requirements (ARARs) addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes and requirements or provide grounds for invoking a waiver.
- •<u>Long-term effectiveness and permanence</u> refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.
- •Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.

- •Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.
- •<u>Implementability</u> is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.
- •<u>Cost</u> includes estimated capital and operation and maintenance (O&M) costs, and net present worth costs.
- •<u>State acceptance indicates</u> whether, based on its review of the RI/FS and Proposed Plan, the State concurs with, opposes, or has no comment on the preferred remedy.
- •<u>Community acceptance</u> would be assessed in the ROD and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports.

COMPARATIVE ANALYSIS OF GROUNDWATER REMEDIAL ALTERNATIVES

Overall Protection of Human Health and the Environment

Alternative 1, No Further Action, would be the least effective of the alternatives in protecting human health and the environment because no active remedial measures are included under this alternative. Furthermore, Alternative 1 would allow the VCM subplume to migrate to the treatment system at the Northrop facility which would cause this system to release unacceptable levels of viny! chloride to the environment. Alternatives 2 and 3 would be protective of human health and the environment as these would remove a sufficient mass of contamination from the VCM subplume so that supplemental treatment for VCM at the Northrop IRM would not be required. Alternative 2 would be more protective than Alternative 3 because Alternative 2 would remove all VOCs to levels that would restore the aquifer to drinking-water quality in the area of the VCM subplume.

Compliance with ARARs

Alternatives 2 and 3, but not Alternative 1, would comply with chemical-specific ARARs, which consist primarily of Federal and State MCLs for groundwater. In time, Alternative 1 would result in the downgradient treatment system at the Northrop facility exceeding its permit limitations for vinyl chloride.

Alternative 2 would reduce the contaminant concentrations in the VCM subplume to achieve MCLs which are the regulatory requirements for the sole source aquifer under Long Island. The discharge of treated groundwater to

recharge basins under Alternative 2 would also meet groundwater discharge standards. Both Alternatives 2 and 3 would reduce the concentration of the VCM subplume to the level that supplemental treatment for VCM at the Northrop IRM would be required. For a complete listing of ARARs, see Tables 3.1, 3.2 and 3.3. of the Hooker/Ruco FS (July 2000).

Long-Term Effectiveness and Permanence

Alternative 1 would not be effective in protecting human health and the environment. In fact, Alternative 1 would result in the downgradient treatment system at the Northrop Facility exceeding its permit limitations for VCM. Both Alternatives 2 and 3, would be effective over the long-term in protecting public health and the environment. Alternative 2, however, would be more protective than Alternative 3, because Alternative 2 is designed to remove all VOCs to levels that will restore the aquifer to drinking water quality in the area of VCM subplume. Also, because in-situ biosparging is an innovative technology, the performance criteria, which would measure the effectiveness of this technology at the Hooker/Ruco Facility, would also need to be developed during remedial design.

Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative 1 would provide no additional reduction of toxicity, mobility or volume of the contaminants at the Site except as provided downgradient by the Northrop Facility's IRM. Alternative 2 would be most effective in reducing the toxicity, mobility and volume of all VOC contaminants, as this alternative would be designed to restore the aquifer to drinking water quality in the area of the VCM subplume. Alternative 3 would reduce the toxicity and mass of VCM and other VOCs and TICs through the introduction of air/oxygen, and possibly substrates and nutrients to promote aerobic in-situ bioremediation. Alternative 3 would reduce the VCM subplume to a level that supplemental treatment at the downgradient Northrop IRM would not be required in order to comply with air discharge limitations for Further, under Alternative 3, any residual VCM. contamination that would not be treated by biosparging or bioremediation would be captured and treated by the Northrop IRM.

Short-Term Effectiveness

Alterative 1 would not involve any remediation and therefore would not pose any short-term impacts to the site workers or the community. Over the long-term, however, site workers and the community would be at potential risk under Alternative 1 because of exposure to VCM at levels that are likely to exceed the air discharge limitations at the Northrop treatment system. Although Alternative 2 would have potential short-term impacts to the site workers during the construction of the groundwater extraction and

treatment system, these impacts would be minimized by following appropriate health and safety measures. Risks to berators of the treatment system would be minimized by following appropriate operation and maintenance procedures and adhering to personal safety measures. Under Alternative 2, catalytic oxidation would be used to treat the off-gas air stream from the treatment of the VCM in order to protect the on-site workers and the community. Because there would be fewer construction activities, Alternative 3 would pose less short-term risk to site workers than Alternative 2. Risks during installation of the air/oxygen delivery systems would be minimized by following appropriate health and safety measures. Risks to operators of the system would be similarly be minimized.

Implementability

Alternative 1 would be the easiest alternative to implement as it does not include any remedial measures. Alternative 2 would be readily implementable as it is a widely used and proven treatment technology. However, Alternative 2 would take longer to implement than Alternative 1 and 3, because it would require the construction of a groundwater extraction and treatment system. Alternative 3 would involve installation of a delivery system for providing air/oxygen (and also nutrients, if necessary) for the in-situ treatment of the VCM and would be easier to implement then Alternative 2 because Alternative 3 would have fewer construction activities.

Cost

The present-worth costs are calculated using a discount factor of five percent and a 30-year time interval for Alternative 2 and 12-year interval for Alternative 3. The estimated capital, operation, maintenance and monitoring (O&M) and present-worth costs for each of the alternatives are presented below:

Alt.	Capital Cost	Annual O&M Cost	Present-Worth Cost
Alt-1	\$0	\$6000	\$74,000
Alt-2	\$4,195,000	\$722,000	\$13,200,000
Alt-3	\$1,260,000	\$319,000	\$3,800,000

^{*} Alternative 1 includes monitoring cost only.

As can be seen by the cost estimates, Alternative 1 would be the least costly alternative to implement. Alternative 2 would be the most costly alternative to implement. The high cost of implementing this alternative is due to the construction and long-term monitoring of a groundwater extraction and treatment system.

State Acceptance

NYSDEC concurs with the preferred alternative.

Community Acceptance

Community acceptance of the preferred alternative will be assessed in the ROD following review of the public comments received on the RI/FS reports and the Proposed Plan.

PREFERRED ALTERNATIVE

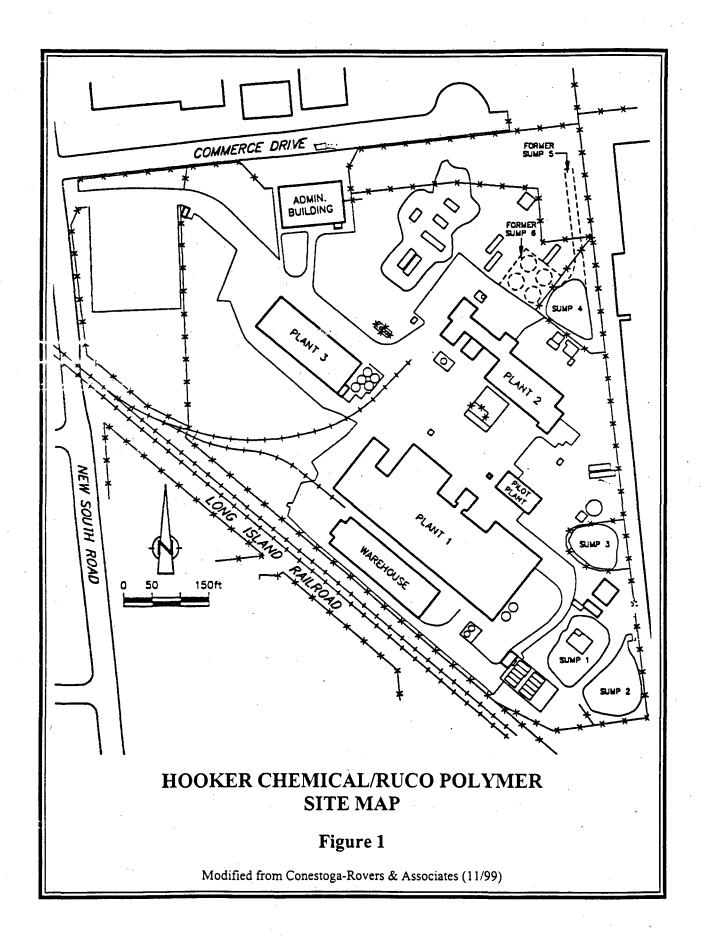
Based upon the results of the RI/FS and other investigative reports and after careful evaluation of the various alternatives, EPA and NYSDEC recommend Alternative 3 -In-Situ Treatment of the VCM Subplume by Bioremediation using Biosparging (Plus Supplemental Nutrient Addition, if deemed necessary) as the preferred alternative. Alternative 3 would be a cost effective and reliable measure to address the VCM subplume contamination at a cost significantly less than Alternative 2. The in-situ method would remove a sufficient mass of the VCM that supplemental treatment of VCM at the downgradient treatment system at the Northrop Facility would not be required to ensure compliance with the air discharge for this treatment system. Because in-situ biosparging is an innovative technology, the performance criteria, which would measure the effectiveness of the technology at the Hooker/Ruco Facility, would need to be developed during the remedial design.

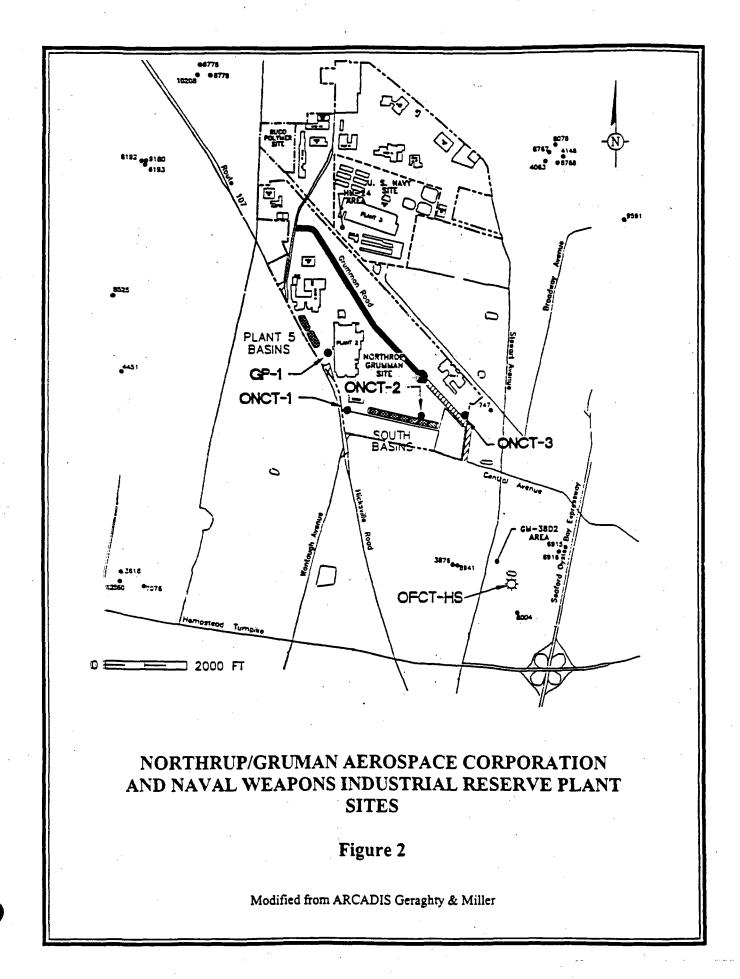
It is expected that the biosparging treatment would be required continued for approximately 10 years to reduce the toxicity of VCM to a level whereby supplemental treatment for VCM at the groundwater extraction and treatment system at the Northrop Facility is not required. If needed, the biosparging could be supplemented with nutrient addition for approximately two additional years to meet the remedial action objectives for a total operating period of 12 years. If it is determined that biosparging would not be effective in reducing the VCM concentrations in a reasonable time frame, then Alternative 2, VCM Subplume Extraction and Treatment, would be implemented as a contingency remedy.

Alternative 3 recognizes that the regional VOC plume is captured by the groundwater extraction and treatment at the Northrop facility and is expected to continue to prevent its further migration. This system is expected to operate for the next thirty years. Alternative 3 also acknowledges the ongoing treatment of the regional VOC plume at the Bethpage Water District municipal wells. If the IRM ceases operation before the aquifer is restored, EPA would reevaluate the protectiveness of the proposed remedy.

The preferred alternative would provide the best balance of trade-offs among alternatives with respect to the evaluating criteria. EPA and NYSDEC believe that the Preferred Alternative would be protective of human health and the

environment, would comply with ARARs, would be costeffective, and would utilize permanent solutions to the naximum extent practicable.





RESPONSIVENESS SUMMARY

Appendix B

Public Notice



The United States Environmental Protection Agency Invites Public Comment on the Proposed Remedial Alternative for the HOOKER CHEMICAL/RUCO POLYMER SUPERFUND SITE Hicksville, New York

The Hooker Chemical/Ruco Polymer Site (Ruco Facility) is an active chemical manufacturing facility comprising approximately 14 acres located in the Town of Hicksville, Nassau County, New York in a mixed industrial and residential area. The United States Environmental Protection Agency (EPA), in consultation with the New York State Department of Environmental Conservation, recently completed a Feasibility Study (FS) that evaluated cleanup alternatives to address contamination at the site. EPA has prepared a Proposed Plan that describes the remedial alternatives and identifies a preferred alternative with the rationale for that preference and is soliciting comments on all of the alternatives. A 30-day public comment period opens on Friday, July 28, 2000.

EPA's preferred alternative is designated as Alternative 3 in the Proposed Plan. This alternative involves the use of an innovative in-situ treatment technology (biosparging) to remediate a localized vinyl chloride monomer (VCM) plume of groundwater contamination which originated from the Ruco Facility.

The Remedial Investigation Report, Risk Assessment, FS, Proposed Plan, and other Site-related documents are contained in the information repositories established for the site, which are available for public review at the following locations:

Hicksville Public Library

169 Jerusalem Avenue Hicksville, NY 11801 (516) 931-1417

Hours: Mon.-Thurs 9 am - 9 pm

Fri. 9 am - 5 pm Sat. 10 am - 5 pm **USEPA Region II**

Superfund Records Center 290 Broadway, 18th Floor (212) 637-637-4308

Hours: Mon.-Thurs. 9 am - 5 pm

EPA will hold a public meeting to discuss the Proposed Plan for the site on Tuesday, August 15, 2000, at 7:00 p.m. at the Oyster Bay Town Hall (Town Board Hearing Room), 54 Audrey Avenue, Oyster Bay, New York. During this meeting, EPA will further elaborate on the reasons for recommending the preferred remedy and public comments will be received.

EPA relies on public input to ensure that the selected remedy for each Superfund Site meets the needs and concerns of the local community. It is important to note that although EPA has identified a preferred alternative for the Ruco Facility, no final decision will be made until EPA has considered all public comments received during the public comment period. EPA will summarize these comments along with EPA's responses in a Responsiveness Summary, which will be included in the Administrative Record file as part of the Record of Decision.

Written comments and questions regarding the Hooker Chemical/Ruco Polymer Site, postmarked no later than August 28, 2000, may be sent to:

Syed Quadri, Project Manager
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, New York 10007-1866
Telephone: (212) 637-4233
Telefax: (212) 637-4284

Internet: quadri.syed @epamail.epa.gov

ADVERTISEMENT

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ADVERTISEMEN



The United States Environmental Protection Agency Invites Public Comment on the Proposed Remedial Alternatives for the HOOKER CHEMICAL/RUCO POLYMER SUPERFUND SITE Hicksville, New York

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169 Jerusalem Avenue
Hicksville, NY 11801
(516) 931-1417
House Mon. Thurs 9 am-9 pm
Pri. 9 am-5 pm
Set. 10 am-5 pm

USEPA Region II Superfund Records Center 290 Broadway, 18th Ploor (212) 637-4308 Rours: Mon.-Thurs. 9 am - 5

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Syed Quadri, Project Manager
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, New York 10007-1866
Telephome: (212) 637-4233
Telefax: (212) 637-4284
Internet: quadri-yed@quantil.gov

VO. POWER



The United States Environmental Protection Agency

HAS EXTENDED THE PUBLIC COMMENT PERIOD

FOR THE

PROPOSED CLEANUP PLAN for the HOOKER CHEMICAL/RUCO POLYMER FEDERAL SUPERFUND SITE

TO

SEPTEMBER 12, 2000

If you would like to submit written comments, please send them to Syed M. Quadri, Project Manager, New York Remediation Branch, US EPA, 290 Broadway, 20th Floor, New York, New York, 10007-1866. Copies of the proposed cleanup plan are available for review at the Hicksville Public Library, located at 169 Jerusalem Avenue. If you have any questions, please call Syed at (212) 637-4233.

RESPONSIVENESS SUMMARY

Appendix C

August 15, 2000 Public Meeting Attendance Sheet

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION II

Hooker Chemical/ Ruco Polymer Superfund Site Hicksville, New York

Done

Tuesday, August 15, 2000 @7:00PM ATTENDESS

(Please Print Clearly)

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION II

Hooker Chemical/ Ruco Polymer Superfund Site Hicksville, New York

Tuesday, August 15, 2000 @7:00PM ATTENDESS

(Please Print Clearly)

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RESPONSIVENESS SUMMARY

Appendix D

Letters Submitted During the Public Comment Period



GLENN SPRINGS HOLDINGS, INC.

2480 Fortune Drive, Suite 300 - Lexington, KY 40509

Steve Whyte Project Manager Telephone (859) 543-2151 Facsimile (859) 543-2171

August 25, 2000

Mr. Syed Quadri
Western New York Remediation Section
Emergency and Remedial Response Division
United States Environmental
Protection Agency, Region II
290 Broadway, 20th Floor
New York, NY 10007-1866

Dear Mr. Quadri:

Re: Proposed Remedial Action Plan (PRAP)

Hooker Chemical/Ruco Polymer Corporation Site

Hicksville, New York

Glenn Springs Holdings, Inc. (GSHI) has reviewed the Proposed Remedial Action Plan (PRAP) issued on July 28, 2000 for the Hooker Chemicals/Ruco Polymer Site (Hooker/Ruco Site) located in Hicksville, New York. Overall, the PRAP provides an accurate summary of the conditions at and in the vicinity of the Site and of the remedial action alternatives evaluated for the vinyl chloride monomer (VCM) subplume. GSHI agrees with the preferred remedy selected by the EPA and for which concurrence from the New York State Department of Environmental Conservation (NYSDEC) has been given.

GSHI has the following specific comments/suggestions regarding the PRAP.

1. Remedial Investigation Summary, Third Paragraph, Fourth Sentence

This sentence reads "In addition, available data indicate that several public supply wells from the Bethpage Water District have been affected by VOCs which are likely attributed to all three sites".

Chemicals from the Hooker/Ruco Site could not have impacted the Bethpage Water District public supply wells located downgradient of the Northrop site. The Hooker/Ruco chemicals have not even reached halfway to the location of the Northrop IRM extraction wells and these wells are located approximately halfway to the Bethpage Water District public supply wells. Consequently, the chemicals from the Hooker/Ruco Site are less than one quarter of the distance to the Bethpage Water District public supply wells.

This sentence could stop after "VOCs" and would still accurately describe the VOC presence without attributing responsibility, which is a matter to be resolved among the PRPs.

2. Remedial Investigation Summary

It is agreed that metals are present in the groundwater beneath the Site. Arsenic and manganese did exceed their to-be-considered (TBC) criteria in the groundwater samples collected for the OU-1 Predesign Investigation. However, their exceedences of the criteria were limited to only a few wells and at concentrations only slightly above their published health standard criteria. Arsenic was present at up to 3.3 times the standard and manganese was present at up to 4.1 times the standard. Gonsequently, the presence of two metals in a few wells does not make metals a contaminant of concern at the Hooker/Ruco Site, especially when compared to the organic chemicals present.

3. Summary of Site Risks, Human Health Risk Assessment, Third Paragraph

The future exposure scenario is highly unlikely to occur, considering that:

- a Nassau County ordinance permits obtaining drinking water only from a public supply source; and
- ii) the public supply sources are being monitored and treatment implemented as needed.

This highly unlikely future exposure scenario should be reiterated so that public concerns regarding the estimated future residential groundwater use scenario risks are put in perspective.

- 4. There are many references in the PRAP for Alternative 1 that state that the Northrop IRM will exceed its air discharge limitations. This statement is based on the results of computer simulations that result in only simulated exceedences. Because of the uncertainty associated with such simulated results, it is suggested that text such as "could potentially exceed its air discharge limitations without the addition of supplemental treatment capability" be used.
- 5. Alternative 3: In-Situ Treatment of VCM Subplume by Bioremediation Using Biosparging First Paragraph, Last Sentence

The text states that aerobic degradation of TCE and PCE is limited. While this is true for PCE, it is not correct for TCE. TCE degradation does readily occur under aerobic conditions, although not as quickly as occurs under anaerobic conditions. This sentence should be revised to reflect the different aerobic degradation rates for these two compounds.

6a. Comparative Analysis of Groundwater Remedial Alternatives - Compliance with ARARs. Second Paragraph, Second Last Sentence

It is believed that "not" should be inserted between "would" and "be required".

6b. Cost - First Sentence

A discount factor of 5 percent is stated as being used for the estimated present worth costs shown in this section. This should be corrected to 7 percent to be consistent with the discount rate of 7 percent shown in the section entitled "Summary of Groundwater Remediation Alternatives".

7. Preferred Alternative

The PRAP identifies Alternative 2 (pump and treat to groundwater ARARs) as the contingency remedy if in-situ biosparging is not effective. It is possible that during the time period of operation of the in-situ biosparging remedy, existing treatment technologies may become more effective or new effective technologies may be developed. Thus, rather than limiting the contingency remedy to a pump and treat system to meet ARARs, it is suggested that the text be rewritten so that the treatment technologies then available be evaluated to select the potentially most effective remedy applicable to the conditions existing at that time.

Given the more recent acknowledgement of the value of natural attenuation, it is also believed that it may not be necessary to pump and treat down to concentrations that meet ARARs. Some monitored natural attenuation may also be included as part of the contingency remedy. Thus an alternative to the specified contingency remedy is to pump and treat to remove a sufficient mass of VCM such that supplemental VCM treatment of the air discharge from the Northrop IRM would not be needed. This would then be consistent with the level of remediation effort proposed for the preferred remedial alternative.

Should you have any questions on the above, please do not hesitate to contact me at (859) 543-2151 or e-mail at steve_whyte@oxy.com.

Sincerely yours,

Steve Whyte

Project Manager

KDS/cm/6883/44

Encl.

c.c.:

K. Lynch (USEPA) M. E. Wieder (USEPA) S. Scharf (DEC) D. Brown

J. Kay

U.S. Environmental Protection Agency Region II 290 Broadway New York, New York 10007-1866

Attention: Cecilia Echols

Community Relations Coordinator

Re: Hooker Chemical/Ruco Polymer Superfund site Hicksville, Nassau County, New York

Gentlemen:

Thank you for sending me your literature regarding the above-respected matter. After reading the literature, it is my opinion that Alternative 2 is the appropriate action to take.

Although Alternative 2 is the costliest option, it is also the most thorough and, therefore, it will be the best for our environment, a consideration that should have been given a lot more thought a long time ago. I feel we owe it to our future to make sure that the right thing is done now.

Thank you for this opportunity to voice my opinion. I hope that it will be given consideration.

Very truly yours,

ANDREA SMITH 29 Lawrence Street Hicksville, New York 516 - 681 - 5647

ARCADIS GERAGHTY&MILLER



Syed Quadri USEPA Project Manager 290 Broadway New York, New York 10007 ARCADIS Geraghty & Miller, Inc. 88 Duryea Road Melville New York 11747 Tel 631 249 7600 Fax 631 249 7610

Dear Mr. Quadri:

ENVIRONMENTAL

ARCADIS Geraghty & Miller has reviewed the proposed groundwater PRAP for the Ruco site and on behalf of the Northrop Grumman Corporation offer the following comments:

Melville, 28 August 2000

1. Northrop Grumman Corporation (NGC) is opposed to any remedial approach that does not intercept and treat the Vinyl Chloride Monomer(VCM) subplume before it affects the downgradient NGC treatment plant.

Contact: Michael F. Wolfert

The alternative remedy proposed, should biosparging be shown not to be
effective, is pump and treat. If a pump and treat system is needed, it should be
designed so that it does not interfere with the goals of the downgradient NGC
pump and treat system.

Extension: (631) 391-5238

3. Based on a review of the pre-design data collected by Conestoga Rover Associates (CRA), the subsurface environment at the Ruco site and immediately downgradient is anaerobic and reducing. Biosparging, by its very nature will disrupt the anaerobic and reducing environment that exists at and off-site (south and southeast) of the Ruco site. The subsurface environment upgradient of the Ruco source area is primarily oxidizing; downgradient of the impacted zone the natural environment reasserts itself with a transitional change to a somewhat oxidizing environment. The biosparging process proposed will disrupt the natural degradation of the source derived chlorinated compounds, i.e., trichloroethene (TCE) and tetrachloroethene (PCE). It is likely that where oxygen is supplied the anaerobic conditions will be disrupted. This will contribute to an increase in the flux of Ruco site-related PCE and TCE downgradient of the source area. Except for the TCE, PCE and dichloroethene (DCE) that is stripped during the biosparge process, there will be no additional remediation of these compounds via the biosparge system. Therefore, the NGC treatment system will have to treat these compounds from the Ruco property and the previously anaerobic off-site area. An evaluation must be made to assess the impact that the disruption of the anaerobic biodegradation zone and the resulting flux of TCE and PCE would have on the downgradient NGC treatment plant.

- 4. Biosparging downgradient of the source area in the transitional and aerobic environments where VCM persists, but the aerobically degradable compounds, like ketones and alcohols, are depleted should enhance the degradation of VCM.
- 5. The following practical issue concerning the application of biosparging must be addressed:
 - ➤ It will be necessary to sparge at extreme depth (greater than 350 feet bls in the downgradient area, where primarily VCM is present). This means that air will have to be forced at pressures in excess of 180 psi to overcome the head exerted by the approximately 320 feet of water column. Thus all the wellhead assemblies must be constructed in accordance with ASME code requirements for similar pressures. Flanges, fittings, and piping must be properly selected and designed for these conditions. This includes the pilot test wells and equipment, as well as the full-scale system components. Wellhead retrofits may be required at existing wellheads and proper health and safety precautions should be adhered to, particularly where public access cannot be controlled.
- 6. There are several process issues that are also critical and may, in fact, preclude the use of biosparging under the site conditions as follows:
 - ➤ Because of the high pressure at which the system must operate to successfully sparge to depths of 320 feet below the water table, the air is compressed when it is released into the groundwater. The pressure upon release will be on the order of 140 to 180 psi (i.e. 10 to 13 atm). At these pressures the actual airflow will be approximately 30 acfm. As the air rises and the pressure declines, the air volume will increase in inverse proportion to the ratio of the initial pressure to the changing pressure. This phenomenon will lead to a reduction in aquifer permeability and a "damming-effect" a decrease in the velocity of groundwater flow can result. The more air forced in and by most standards the volumes proposed are high for biosparging the greater the effect on the permeability.
 - Another impact is more subtle, but somewhat more disastrous. Because the air is released under 10 atm of pressure, the saturation concentration of oxygen in the water is more than 10 times that under atmospheric pressure or in excess of 150 mg/l. That is good if more dissolved oxygen is needed, but is bad for any bacteria trying to survive at depth in the formation. The high oxygen concentration will poison the bacterial population. This effect will be reduced as the air rises and the pressure drops to a point where the DO

can fall into a more reasonable range – less than 50 mg/l. This translates to a depth of less than 100 feet.

- When air is injected into the ground, it will rise along the path of least resistance to the water table. The geology at the site is heterogeneous due to its depositional history. As a result there are layers of variable permeability throughout the depth of the formation. This layering has some influence on groundwater flow, but has a much greater affect on airflow. This layering will lead to the preferential flow of the air along high permeability lenses horizontally. During pilot testing it is critical that the furthest monitoring wells be located at a minimum of 2 times the total injection depth to monitor this effect. In addition, the air can carry stripped VCM outward from the target groundwater zone, thus potentially spreading the VCM impacts both in the groundwater and in the vadose zone. Monitoring points should be included to track this effect and accurately define it.
- ➤ VCM is a very volatile organic compound. At the proposed rates of air injection stripping of the VCM from groundwater will occur and could represent the chief mechanism of mass removal. Monitoring points should be added to track this effect and accurately define it. In addition, lower airflow rates should be tested to try to minimize this effect, although it is likely that the effect cannot be eliminated completely.
- Finally, the rate of injection is higher than typical biosparge applications, which exacerbates all the effects described above. At a minimum lower rates should be tested and the proposed rate of 300 scfm should be seriously reconsidered.
- 7. The FS evaluation and cost projections summarized in the PRAP do not account for some of the issues described above. There are ways to overcome some of these issues (such as the use of blended gases -air plus nitrogen for example to control the concentration of DO that can enter the groundwater) but at higher cost. Such considerations should be included in the cost comparison. At a minimum these issues and costs must be included in the pilot test program and in the subsequent data evaluation and full scale design and costing.
- 8. The PRAP includes a contingency for the addition of nitrogen and phosphorous to supplement the aerobic biodegradation of VCM in the groundwater. Given the fact that the groundwater is used for drinking water supplies in the area, the application of nutrients will require extensive permitting and monitoring.

- 9. The goal of the biosparge treatment system is to treat the VCM to a level that will ensure that there will be no need for supplemental treatment for VCM at the NGC treatment system. However, a VCM contingency plan should be developed tto protect the NGC treatment plant from levels of untreated VCM that, if treated thy the NGC plant, would result in exceedance of air discharge standards.
- 10. The PRAP recognizes that a portion of the chlorinated plume originating from the Ruco site is not addressed by the proposed remedy, but has been and continues to be treated by the NGC treatment system and the wellhead treatment ssystems provided for impacted public supply wells and funded by NGC and the Navy. It is clear that OCC should share the costs for these other treatment ssystems as well as the long-term O&M. Therefore, it is requested that the issue cofcost recovery be addressed in the consent order to be issued to OCC for the RD/RA phase of the project.

If you have any questions please call us.

Sincerely,

ARCADIS Geraghty & Miller, Inc.

Carlo San Giovanni

Project Manager

Michael F. Wolfert Project Director

Copies:

John Colman - NGC Larryi Leskovjan - NGC Steve Scharf - NYSDEC

TO THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

September 22, 2000

Region II 209 Broadway New York, New York 10007-1866 Page 1 of 92

EMERGENCY AND REMEDIAL RESPONSE DIVISION

NEW YORK REMEDIATION BRANCH

WESTERN NEW YORK REMEDIATION SECTION

To: Syed M. Quadri

Phone: 212-637-4233

Fax: 212-637-4284

Joseph Sadowski

Rebecca Carley, MD

30 Murray Road

9 Sutherland Road

Hicksville, New York 11801

Hicksville, New York 11801

516-935-4176

516-433-0774

As per the telephone conversation for the extension, for the comment period, this is set forth to the United States Environmental Protection Agency upon facts and request in which is found in the information set forth from the reports and meeting which should be

complied with as asked for by proof of submission with exhibits paid for by the people.

ALPHA TO OMEGA

ALPHA

Feasibility studies were completed in August 1992 and August 1993, respectively, for the Hooker/Ruco Polymer Site.

At this time, why did the Board of Health neglect to place a warning around the area that the water may be contaminated if for no one else, at least the women that were pregnant?

In April 1994, Occidental Chemical Corporation initiated a program to investigate ground water conditions beyond the Ruco Property. The feasibility study was to address the off-site vinyl chloride monomer subplume in Bethpage Regional Aquifer (Operable Unit - 3).

EXHIBIT # 1 FIGURE A.3.4

VCM DISTRIBUTION IN THE VERY DEEP ZONE

This clearly shows the heavy concentration of contamination in our water supply

and is clearly heading in a westerly direction, not as the D.E.C. states water moves from North to South.

EXHIBIT # 2 FIGURE 4.2

GENERALIZED REGIONAL HYDROGEOLOGIC SECTION THROUGH NASSAU COUNTY 0U-3 REMEDIAL INVESTIGATION HOOKER/RUCO

SITE, HICKSVILLE, NEW YORK

This clearly shows the regional ground water divide with the approximate location of study area, with the investigating company leaving off the scale for measurement, one can only believe they are trying to hide from the public the distance between the two.

This clearly shows, to the North of the study area and the distance to the South of the REGIONAL GROUND WATER DIVIDE, the pollutants are entering the REGIONAL GROUND WATER DIVIDE, which in turn does enter the LLOYD AQUIFER by this example.

EXHIBIT #3 FIGURE H.2.8

UPDATED G & M CALIBRATED GROUND WATER FLOW MODEL

STEADY-STATE HYDRAULIC HEAD IN LAYER 7

You will find that at this level when nature takes its course and rains, that being inside the study area the water would have to run into Hicksville water wells at Plant # 9 and at the water plant at # 4 Dean Street in Hicksville. As you can see, the elevation is the same as Plant # 9, and the plant at Dean Street which sits within the elevation of 66 on the exhibit with a lower elevation running into the public wells, therefore running into and around the casing which are placed into the ground for the supply of public water.

EXHIBIT #4 FIGURE H.5.7

NORTHROP 1 RM STEADY - STATE HYDRAULIC HEAD IN LAYER 6

OF REFINED MODEL AND FIGURE 5.1 MID-1970'S TRICHLOROETHYLENE

GROUNDWATER CONCENTRATIONS OU-3 REMEDIAL INVESTIGATION

These exhibits clearly show that **Hooker Rucco Chemical** and the **Navy facility** and **Grumman Corporation** exist above this level showing at Layer 6 two public water wells sit on this level with contaminants falling into the LLOYD AQUIFER by means of the quickest way of following the flow, which is following the casing that has been placed in by man, and breaching the natural protection of our LLOYD'S AQUIFER.

In 1994, Occidental Chemical Corporation initiated a program to investigate groundwater conditions beyond the Ruco Property to collect additional ground water data around and primarily west of the Hooker/Ruco Site to complete the RI, and to prepare a FS to address the off site vinyl chloride monomer.

This exhibit clearly shows misinformation. This is just one of a few misinformed exhibits shown to the public. You will notice town water wells on the top left corner of the page. This exhibit shows these wells on the East side of the railroad.

They show they are on LILCO property.

You will also note that this exhibit does not even show the Levitown water well or tower.

EXHIBIT #6 FIGURE 4.5

POTENTIOMETRIC SURFACE ELEVATION OF THE MAGOTHY

AQUIFER BETHPAGE - HICKSVILLE LEVITTOWN AREA, APRIL 1986

0U-3 REMEDIAL INVESTIGATION

This exhibit clearly shows the public- supply well used for water. You will note

that the wells are on the West side of the railroad tracks for plant # 9 at Alicia Street.

This is marked yellow on the top left corner of the page.

EXHIBIT 7 FIGURE 5.11

GROUND WATER TRICHLOROETHYLENE CONCENTRATIONS OU - 3

REMEDIAL INVESTIGATION

This exhibit clearly shows that the test well M.W. 56 across from Hooker/Ruco Chemical at a stones throw across the railroad tracks is no where near the public wells.

EXHIBIT #8 FIGURE H.2.8

UPDATED G & M CALIBRATED GROUND WATER FLOW MODEL

STEADY - STATE HYDRAULIC HEAD IN LAYER 7 OU - 3

REMEDIAL INVESTIGATION

This exhibit clearly shows that plant # 9 is on the west side of the railroad which clearly shows conflicting evidence to a super fund commission which in turn shows that this report is made up at will.

If you please take note that Hooker/Ruco Chemical and the Navy and Grumman

Corporation are at the same plateau as the two water companies. This is marked in green, and runs from East to West without any doubt as to your report.

EXHIBIT 9 FIGURE 5.12

GROUND WATER TRICHLOROETHYLENE CONCENTRATIONS

SCHEMATIC OU - 3 RLMEDIAL INVESTIGATION

This exhibit clearly shows in which the water flows and disagrees with the statement of the D. E. C.

The stream on Layer 3 clearly shows (in green) that the water is running to the North and/or shows a grate pool beginning in Layer 4. It is clear that this pool is heading to the North - NorthEast.

In Layer 5, it is clear that there is a vane and a pool and possibly a large pool or that pool is heading to the East, not the South, which is polluting the water in Levittown.

.

In layer 6, there is no doubt that there is a small pond shown. This is at a level of 380 feet to 495 feet.

EXHIBIT # 10 FIGURE 5.14

GROUND WATER TETRACHLOROETHYLENE CONCENTRATIONS

SCHEMATIC OU - 3 REMEDIAL INVESTIGATION

If we please go to the Layer # 6 @ the 360 to 495 foot level, you will find the pond moving downward to Layer # 7. This is the 495 - 610 foot level, and you will see the pond is dropping off to the West and it is moving in a downward position.

Please go back to Exhibit # 2 Regional Ground Water Divide. You will notice at that level that the contamination has fallen into the LLOYD AQUIFER, therefore contaminating all of Long Island's water supply.

EXHIBIT #11

HICKSVILLE WATER DISTRICT

4.6 MILLION DOLLARS TO BE PAID FOR AIR STRIPPING UNITS AND GENERAL REHABILITATION OF THE PLANT AND SITE, PLANT #9

The public was asked to pay for air stripping units which had nothing to do with the natural course of the refining of the water. This so called air stripping unit was built to take contaminants out of the water, which in turn should have been paid for by

Hooker/Ruco Chemical, the Navy, and Grumman Corp; instead of raising the price of water.

EXHIBIT # 12

A LETTER FROM JANICE ZIEGELE OF LINDENHURST, NEW YORK

The concerns of the public. This person works in Farmingdale, just East of Grummans. This states: many females in the office became afflicted with cysts of the ovaries; all age groups and all races. Coincidence?

THEY WANT AN ANSWER! I HAVE IT! The water contaminants are traveling into the regional ground water divide as its location to the location of the study area of contaminants which is shown on Exhibit # 2.

EXHIBIT # 13

MINUTES BY FINK & CARNEY REPORTING PUBLIC MEETING FOR

PROPOSED PLAN FOR THE HOOKER CHEMICAL/RUCO POLYMER SITE

OYSTER BAY TOWN HALL

AUGUST 15, 2000

Exhibit 13, pg. 58, starting from line 14 to line 19. Mr. Simonello: "So you're

saying from New (line 15) South over and out towards --- "line 16, Mr. Scharf: "It's approaching Hempstead Turnpike", line 17: "in the deeper groundwater"

line 18: Mr. Lynch: "It's close to 600 feet deep."

Stephen Scharf is from New York State Department of Environmental Protection Agency. Without a doubt, it has declared that the contaminants is approaching or in the Hempstead Turnpike area. This means that the gases are being released through the ground in residential areas and has passed Grummans, the Navy, and Hooker/Chemical Ruco Polymer Site.

Then we have Mr. Kevin Lynch. He is the Chief of Western New York

Remediation Section. On line 18 of page.58 of these minutes, it is clearly admitted to
the contaminants being in and around the 600 foot level.

Exhibit # 2 clearly shows that at 600 feet or a well point pulling a liquid to be tested out of the well is in the LLOYD'S AQUIFER.

EXHIBIT #14

MINUTES FROM TOWN HEARING, PAGE 59, LINE 14.

The Navy or Grumman and the Navy facility is operated by Grumman.

To set the record straight, whereever the Navy is, it is a protected compound, a federal compound protected by Federal Police and are responsible for whatever happens upon it; whether it's rented property or not.

Starting back in the early 80's, the state approached Grumman to do something about the water cleanup. So, even though the contamination has been around the area for 20 years, addressing the Grumman problem, (as well as the Hooker Chemical/Ruco problem) as a superfund *left no liability on the proper people*, such as the, Navy, Grumman, and Hooker Chemical.

WHY DID THE FEDERAL GOVERNMENT PASS THE 6 YEARS
ENVIRONMENTAL IMPACT STUDY TIME LIMIT?

WHY DID THE GOVERNMENT AND THE STATE ALLOW THE

STATUTE OF LIMITATION TO RUN OUT ON GRUMMAN'S, AND HOOKER

CHEMICAL/RUCO POLYMER?

WHY DID THE FEDERAL GOVERNMENT NOT TAKE ACTION WHEN

IT WAS CLEAR THAT THE NAVY WAS IN A LARGE WAY RESPONSIBLE

FOR THIS CONDITION?

WHY, WHEN AS PER THE CONSTITUTION OF THE UNITED STATES,
WHEN THE ARMED FORCES CREATES DAMAGES TO THE PUBLIC IN

PEACE TIME AND THE DAMAGES ARE TO BE CORRECTED AND

COMPENSATION SHALL BE PAID TO EACH PERSON ON THE LEVEL OF

DAMAGE WHICH WAS CREATED?

WHY SHOULD GRUMMAN AEROSPACE PROGRAM, WHICH BUILT

EXPERIMENTAL AIRCRAFT FOR THE GOVERNMENT, THE ARMED

FORCES, A BIDDER ON ALL, CONTRACT WITH BONDS THAT HAD TO BE

PRODUCED BEFORE THE SIGNING OF EACH CONTRACT, (THEREFORE,

A BUSINESS FOR THE GOVERNMENT), BE EXEMPT FROM LIABILITY,

WITH THE BONDS IN PLACE FOR DAMAGES TO THE GOVERNMENT AND

THE PEOPLE?

WHY DID THE GOVERNMENT NOT PLACE A LEAN ON THE

PROPERTY OF THE GRUMMAN AERO-SPACE PROPERTY?

WHY DID THE FEDERAL D. E. C. NOT SEIZE THE PROPERTY OF

GRUMMAN AERO-SPACE PROPERTY FOR DAMAGES TO THE PEOPLE?

WHY DID THE FEDERAL GOVERNMENT ALLOW GRUMMAN AERO-

SPACE TO CLOSE THEIR LARGE PLANT, PUTTING MANY PEOPLE OUT

OF WORK; AND THEN ALLOW GRUMMAN TO SELL THE PROPERTY?

WHY DID THE FEDERAL GOVERNMENT NOT CALL IN ALL BONDS

THAT WERE PUT UP BY GRUMMAN AERO-SPACE WHICH HAD A CLAUSE

OF REPAIRING OR REPLACING DAMAGE TO ANY ONE, OR ALL PERSONS

THAT WERE DAMAGED?

WHY DID THE DEPARTMENT OF HEALTH NOT PUT A WARNING TO

THE PUBLIC THAT THERE WAS A PROBLEM WITH THE DRINKING

WATER?

WHY DID THE DEPARTMENT OF HEALTH NOT PUT OUT A

WARNING WITH A LIST OF CHEMICALS TO THE PUBLIC THAT EACH

OF THE CHEMICALS IN THE POLLUTED AREA CAUSES CANCER IN TEST

ANIMALS?

WHY DID THE DEPARTMENT OF HEALTH NOT INFORM PREGNANT
WOMEN THAT THE WATER MAY BE A HAZARD TO THE WELL BEING OF
THEIR FETUS?

EXHIBIT # 15

TRANSCRIPT OF D. E. C. MEETING, PAGE 6, LINE #9

(Mr. Kevin M. Lynch, Chief, Western New York Remediation Section)

"We find a community with a heavily contaminated water supply, we can supply alternate water"

EXHIBIT # 16

TRANSCRIPT PAGE 7, MR. LYNCH, LINE 5

"In addition, we can have any of those people perform the studies and the clean-up, or what we can do is we go spend the money from the Superfund, and then we have the authorization to go after them to recover the money that we used to pay for it"

WHY DIDN'T THE D.E.C. START THE CLEAN UP AFTER THEY

HAD KNOWLEDGE OF THE CONTAMINATION?

EXHIBIT # 17

TRANSCRIPT PAGE 9, LINE 5 TO 10, MR. LYNCH

"We then move into the feasibility study stage, and what the feasibility study is, it's a study of various alternative solutions to the site that we compare to one another and we use criteria that the regulations require us to look for to compare one site on the other."

The feasibility study was completed in 1993. This being the case, why didn't the

Board of Health, after seeing a hazard to the water supply, do NOTHING?

WHY IS BIOSPARGING EVEN BEING CONSIDERED AS A SOLUTION,

WHEN IT ONLY ADDRESSES ONE OF THE MANY CONTAMINANTS (i.e.,

VINYL CHLORIDE) ALL OF WHICH CAUSE CANCER IN TEST ANIMALS?

EXHIBIT # 18

EXECUTIVE SUMMARY #1 INTRODUCTION LINE 2

"A remedial investigation (RI) and feasibility study (FS) were completed in

August 1992 and August 1993"

This clearly shows with your own information that a feasibility study was completed.

EXHIBIT #19

MR. LYNCH, TRANSCRIPT PAGE 10, LINES # 5 TO 9

"We look at the long-term effect in this, we're looking for something that is going to work in the long-term, we don't just want to put a bandaid and walk away from it and have a problem crop up later."

As per exhibit 17 comments (supra), WHY IS BIOSPARGING EVEN BEING

CONSIDERED AS A SOLUTION, WHEN IT ONLY ADDRESSES ONE OF THE

MANY CONTAMINANTS (i.e., VINYL CHLORIDE) ALL OF WHICH CAUSE

CANCER IN TEST ANIMALS? WORSE YET, WHEN THE VINYL CHLORIDE

CONTINUES TO MIGRATE IF THE BACTERIA DO NOT RECEIVE ENOUGH

OXYGEN TO SUSTAIN THEM AS THEY METABOLIZE THE VINYL

CHLORIDE?

WHY WASN'T THE PUBLIC NOTIFIED THAT THE PROBLEM

EXISTED, AND WHY DIDN'T THE B.O.H. NOTIFY ALL OF US TO

PUT OUR OWN BANDAID ON THE WATER LINES COMING INTO THE

HOMES OF THE PEOPLE UNTIL THE ULTIMATE SOLUTION WAS FOUND?

WHY DID IT TAKE AN ADDITIONAL 7 YEARS FOR THE D.E.C. TO

COME UP WITH A PROPOSED PLAN?

WHY DIDNT THE B.O.H. ANNOUNCE TO THE PUBLIC, AT THE

MEETING HELD ON AUGUST 15, 2000, THAT THERE IS A SERIOUS

PROBLEM WITH THE WATER ALL OVER LONG ISLAND (SINCE THE

CONTAMINANTS HAVE REACHED THE LLOYD'S AQUIFER (SUPRA), AND

THAT IT WILL TAKE 20-30 YEARS TO TREAT THE PROBLEM?

WHY WASN'T THE PUBLIC INFORMED THAT IT IS NOT JUST THE

DRINKING WATER THAT IS A PROBLEM; BUT ALSO THEIR BATHING

WATER, SINCE AS MUCH IF NOT MORE OF THE CARCINOGENIC

CONTAMINANTS ARE ENTERING THE BODIES OF LONG ISLANDERS

THROUGH THEIR PORES OPENED BY WARM WATER WHEN THEY

BATHE AS ENTERS ORALLY VIA INGESTION OF THE WATER?

WHY WASN'T THE PUBLIC INFORMED THAT THERE IS A QUICK

FIX (AS OPPOSED TO A BANDAID) AVAILABLE TO THEM VIA A

COMPUTER WATER MONITORING FILTER INSTALLED AT THE INTAKE

LEVEL INTO THE RESIDENCE; BETTER YET, WHEN SUCH A SYSTEM

CAN BE PURCHASED FOR AS LITTLE AS \$300/HOUSEHOLD?

EXHIBIT #20

MR. SCHARF, LINE # 16 TO 25, THE TRANSCRIPT

"Its approaching Hempstead Turnpike in the deeper ground water"

WHY IS IT NOT SHOWN EXACTLY AS TO WHERE THE

CONTAMINANTS HAVE ARRIVED AS THEY APPROACH

HEMPSTEAD TURNPIKE?

WHY WERE THE RESIDENTS IN THE AREA NOT NOTIFIED THAT
THERE IS A POTENTIAL GAS BEING RELEASED THROUGH THE

GROUND WHICH IS ODORLESS, AND CAUSES NERVE DAMAGE AND CANCER?

GAS POCKETS ARE ONLY "POCKETS" WHEN SURROUNDED BY
A CLAY BASE MATERIAL, AND WILL BE RELEASED THROUGH THE
GROUND WHERE THERE IS SAND AND GRAYEL!

AS WE ALL KNOW, LONG ISLAND IS SAND AND GRAVEL.

As per Mr. Lynch, "It's close to 600 feet deep"...

ACCORDING TO EXHIBIT # 2 OF THE RECORD, THIS LEVEL

REACHED AT 600 FEET IS IN THE LLOYD'S AQUIFER, WHICH

COMMUNICATES WITH THE REST OF LONG ISLAND!

MR. SIMONELLO, WHY HAS IT TAKEN 20 YEARS?

WE HEARD ABOUT THIS SAME PROBLEM IN THE HICKSVILLE

PUBLIC LIBRARY APPROXIMATELY 18 YEARS AGO WHEN THIS WAS

ALL DISCUSSED AND THE AREA WAS DESIGNATED AS A SUPERFUND

SITE; WE WERE TOLD NOT TO WORRY. WHY WERE WE TOLD NOT TO

WORRY?

EXHIBIT # 21

TRANSCRIPT LINE 4 TO 25

(see exhibit #21 for text)

Line 14- "and the Navy facility is operated by Grumman, has been pumping 14 million gallons of water a day"

The Grumman Corp. has been well aware that the ground water was contaminated mainly from their sources and some from other sources. And starting probably back in the early 70's, the State had approached Grumman to do something about this.

THIS CLEARLY SHOWS THAT THE PROBLEM EXISTED FOR OVER
30 YEARS. WHY DID THE D.O.H. ALLOW THE PUBLIC NOT TO KNOW
THEIR RIGHT OF THE EXACT POLLUTION AND THAT IT WAS POSSIBLY
NON-ODOROUS (AND THEREFORE UNDETECTABLE)?

EXHIBIT # 22

TRANSCRIPT PAGE 61, LINES 5 TO 11

(SEE EXHIBIT FOR TEXT)

MR. SCHARF MAKES NO MISTAKE ABOUT IT, IT'S A PROBLEM!

EXHIBIT # 23

TRANSCRIPT MR. GILDAY, PAGE 62, LINE 8 TO 22

"If you could see what they're extracting through the carbon, actually able to extract T.C.E. out of the ground water to a tune of probably about one drum, a 55 gallon drum per week, maybe every other week, and that's about 95 % pure T.C.E. through the system they have"

WHY WEREN'T THE PEOPLE TOLD WHAT THEY ARE PUMPING INTO DRUMS TO THE TUNE OF 55 GALLONS/WEEK?

WHY WEREN'T THE PEOPLE TOLD THAT IF THEY ARE TAKING
THAT MUCH OUT, THAT THERE HAS TO BE AN ENORMOUS AMOUNT
UNDERGROUND, <u>SINCE THE ENTIRE LLOYD'S AQUIFER HAS BEEN</u>
CONTAMINATED?

AS PER EXHIBIT # 19 (SUPRA), WHY WASN'T THE PUBLIC INFORMED THAT THERE IS A QUICK FIX (AS OPPOSED TO A BANDAID) AVAILABLE TO THEM VIA A COMPUTER WATER MONITORING FILTER INSTALLED AT THE INTAKE LEVEL INTO THE RESIDENCE; BETTER YET, WHEN SUCH A SYSTEM CAN BE PURCHASED FOR AS LITTLE AS \$300/HOUSEHOLD?

Line 22: "Those areas had a lot of either perchlorethylene or trichlorethylene or even PCB's in there"

WHY WASN'T THE PUBLIC TOLD THAT ALL THESE CHEMICALS
CAUSE CANCER?

EXHIBIT #24

TRANSCRIPT MR. SCHARF, PAGE 64, LINES 3 TO 5

"1995, when we were dealing with one of the more contaminated PCB areas on the site, that was part of plant 3 that the Navy..."

THIS PROVES THAT THE NAVY HAS POLLUTED OUR GROUND

EXHIBIT #25

TRANSCRIPT PAGE 66, LINE 12 TO 17

"knowing that vinyl chloride, the main contaminant concerned, is a known carcinogen, is a paramount issue"

line 15: "that we don't ever want that material to be exposed, and it's for the protection of human health and the environment"

IN 1970, SCIENTISTS FOUND THAT INHALATION OF VINYL

CHLORIDE BY RATS LED TO VASCULAR AND BONE CHANGES AND TO

CANCER. IT HAS BEEN FOUND TO CAUSE CANCER OF THE LIVER IN

HUMANS THAT CANNOT BE DIAGNOSED UNTIL IT IS INCURABLE.

WHY WERE HOMES ALLOWED TO BE BUILT ON THE RUNWAYS OF GRUMMAN (where transmission fluid containing PCB's has seeped into the ground), WHEN ALL THESE CONTAMINANTS WHICH DO NOT BREAK

DOWN WERE KNOWN TO BE BENEATH?

EXHIBIT # 26

TRANSCRIPT MR. GILDAY, PAGE 75, LINE 4 TO 16

Mr. Gilday: "we'll go down as far as we need to until it is clean"

Line 7: Mr. Gilday: "in fact we asked a number of people from Grumman about that, if we have contamination and it's not found at that depth, we say go down deeper until you find the bottom of it"

THIS IS DANGEROUS, AS EACH TIME THEY BREAK THROUGH THE LLOYD'S AQUIFER, THEY CREATE A CONDITION OF MORE CONTAMINANT GOING INTO THE LLOYD'S AQUIFER

Line 15, Mr. Andriola: "and the wells are anywhere from 580 to 640 feet"

EXHIBIT # 2 CLEARLY SHOWS THAT THIS IS IN THE LLOYD'S

AQUIFER

EXHIBIT #27

TRANSCRIPT, PAGE 81, LINE 12 TO 16, MR. SIMONELLO

"I don't know if you can answer this question, but the U.S. Navy was supposed to

come down and clean up the site, the 108 acres of the Grumman property; whatever

became of that?"

WHAT IS THE NAVY DOING ABOUT THE DESTRUCTION OF THE WATER SOURCE FOR ALL OF LONG ISLAND FOR WHICH THEY ARE LARGELY RESPONSIBLE?

EXHIBIT # 28

TRANSCRIPT, PAGE 83, LINES 10 TO 12

"There will be residuals, perhaps it will be 20 feet down, it will be 10 feet down, it may be on the surface"

THE SAME WAY GOLD WORKS ITS WAY TO THE SURFACE AS IT IS LIGHTER, GASES WORK THEIR WAY TO THE SURFACE; AND CHEMICAL COMPOUNDS, AS THEY ARE BROKEN UP, SOME WILL WORK THEIR WAY TO THE SURFACE.

EXHIBIT # 29

TRANSCRIPT, MR. SCHARF, PG. 84, LINES 11 TO 13

"But again, these are questions really that we should hold off to the Navy public meeting that's coming up."

WHY SHOULD MORE AND MORE PEOPLE GET SICK WHILE

WAITING FOR THE NAVY TO DECIDE IF SOMEONE ELSE IS GOING TO

CLEAN UP THE AQUIFER? WHEN, IN FACT, IT IS THEIR OBLIGATION

AND RESPONSIBILITY AS PER THE CONSTITUTION OF THE UNITED

STATES TO STOP THE POLLUTION WHICH WAS CREATED BY THE

FEDERAL GOVERNMENT. AS EACH DAY GOES BY, MORE AND MORE

PEOPLE GET SICK.

EXHIBIT #30

PAGE 86, TRANSCRIPT, LINE 4 TO 25

This refers to the collection of chemicals in carbon then <u>burned</u> with the end results of the burnt materials and gases going out the smoke stacks and <u>then causes</u>

<u>a fallout, THE POLLUTION FROM WHICH OBVIOUSLY GETS ADDED INTO</u>

THE GROUNDWATER AS WELL AFTER RAINFALL CAUSES ITS SEEPAGE

INTO THE GROUND.

EXHIBIT #31

TRANSCRIPT, PAGE 97, LINE 3

"There were <u>two dates shown on the mailing</u>. This would be August 15 and 16, 2000".

ANY MEETING OF THE FEDERAL GOVERNMENT MUST SHOW THE DATE OF WHICH THE MEETING IS GOING TO BE HELD.

WAS THIS DONE CORRECTLY, AND, IF NOT, SHOULD ANOTHER

MEETING BE SCHEDULED AS A REMEDY?

WORSE YET, WAS THIS DONE INTENTIONALLY TO CAUSE A

DECREASED ATTENDANCE AT THE MEETING?

I, MR. SADOWSKI AM THE CHAIRMAN OF A CORPORATION; AND,

AS SUCH, WOULD HAVE TO RESCHEDULE SUCH A MEETING.

NEITHER D. E. C. NOR D. E. P. WOULD ALLOW THIS TO HAPPEN;

WORSE YET, I, JOSEPH SADOWSKI, WAS ASKED NOT TO ASK ANY MORE

TECHNICAL QUESTIONS UNTIL THE END OF THE MEETING.. WHY?

EXHIBIT 32

INVESTIGATION REPORT 5.4

PESTICIDES/PCB'S

<u>NO</u> PESTICIDES (SEE SECTION 3 . 4 . 1) WERE COLLECTED IN THE GROUND WATER FROM WELLS M . W . 50 AND M . W . 53. THEREFORE, PESTICIDES WERE NOT REQUIRED TO BE COLLECTED AND ANALYZED FOR <u>ANY FUTURE B . R . P . GROUND WATER SAMPLES</u>.

SINCE IT IS A KNOWN FACT THAT:

- # 1 MOST LONG ISLANDERS FOR YEARS HAVE USED PESTICIDES
 AND FERTILIZERS ON THEIR LAWNS AND GARDENS, (ESPECIALLY
 WHEN THE ISLAND WAS COVERED WITH FARMS);
- #2 WE ARE ALSO SPRAYED WITH PESTICIDES FOR ALLEGED
 MICROORGANISMS IN OUR ENVIRONMENT (FOR EXAMPLE, WEST NILE
 VIRUS, WHICH IS KNOWN TO BE EXPERIMENTED ON IN ANOTHER

#3 - BREAST CANCER IN PARTICULAR IS SPECIFICALLY CAUSED

BY PESTICIDES, WHICH ARE STORED IN FATTY TISSUE (OF WHICH THE

BREAST IS LARGELY COMPOSED);

#4 - LONG ISLAND HAS ONE OF THE HIGHEST BREAST CANCER

RATES ON THE PLANET; AND HAS ALSO DRAMATICALLY INCREASED IN

THE NUMBER OF ESTROGEN RECEPTOR POSITIVE BREAST CANCERS;

5 - RESEARCHERS VERA GO, JOAN GAREY, MARY WOLFF AND

BEATRIZ POGO FROM THE MOUNT SINAI SCHOOL OF MEDICINE HAVE

LOOKED AT FOUR INSECTICIDES FROM THE SYNTHETIC PYRETHROID

FAMILY (SUMITHI, FENVALERATE, ALLETHRIN AND PERMETHRIN),

AND FOUND THAT BOTH PROLIFERATION OF BREAST CANCER CELLS, AS

WELL AS ACTIVITY OF A GENE CALLED PS2 (WHOSE ACTIVITY IS

DIRECTLY PROMOTED BY ESTROGEN) WERE INCREASED;

SINCE THE SPECIFIC INCREASE IN BREAST

CANCER IS OBVIOUSLY DUE TO PESTICIDE USE ON

LONG ISLAND SEEPING INTO THE LLOYD'S AQUIFER,

WATER FROM WHICH BATHES THE BREASTS OF ALL

WOMEN ON LONG ISLAND; HOW COULD A NON
FINDING OF PESTICIDES IN THE GROUND WATER BE

BELIEVABLE?

EXHIBIT 33

4 PAGES; COMMENTS OF JIMMY (HUSBAND OF MARGARET)

FLEMING AT A MEETING FOR HOOKER CHEMICAL PUBLISHED IN THE

HICKSVILLE ILLUSTRATED NEWS

Published concerns of the Flemings regarding the water have caused them to purchase, at their *own expense*, bottled water ever since the September 16, 1993, meeting discussed in the enclosed article. Such purchase of bottled water, however, has not

OTHER LIVING CREATURE ON LONG ISLAND. Mr. And Mrs. Fleming

started to purchase said bottled water due to their belief that the situation was not

going to be handled properly. HAS THE FEDERAL GOVERNMENT PROPERLY

HANDLED THE INVESTIGATION AND CLEAN-UP OF THE CARCINOGENS

NOW CONTAMINATING THE WATER SUPPLY OF THE ENTIRE ISLAND

WHICH WAS CAUSED BY FEDERAL ENTITIES?

THE DUE PROCESS OF LAW AND EQUAL PROTECTION OF THE LAW
CLAUSES OF FEDERAL AND STATE CONSTITUTIONS PROTECTS THE
RIGHTS ALONE, AND HAVE NO REFERENCE TO THE MERE
CONCESSIONS OR MERE PRIVILEDGES WHICH MAY BE BESTOWED OR
WITHHELD BY THE STATE OR A MUNICIPALITY AT WILL. (BUNN V. City
of Atlanta, 19 S.E. 2 d, 553, 554, 67 Ga. App. 147.)

EXHIBIT #34

TRANSCRIPT, PAGE 99, LINE 6

"MR. SADOWSKI: I HAVE ONE OTHER COMMENT. I STATED TO YOU

THAT THE INFORMATION IS OFF, THE EVIDENCE IS CONFLICTING

INSIDE; AND ACCORDING TO RULE 9 OF THE FEDERAL COURT OF

PROCEDURE, I HAVE TO NOTIFY YOU OF THAT AT THIS HEARING

BECAUSE YOU THEN THEREFORE HAVE TO FOLLOW [THE RULES OF

CIVIL PROCEDURE OF THE FEDERAL COURT AT THIS TIME].

CLOSING STATEMENT OF DR. REBECCA CARLEY

EACH AND EVERY ONE OF THE CONTAMINATING CHEMICALS IN OUR WATER SUPPLY HAVE BEEN SHOWN IN LABORATORY EXPERIMENTS TO BE CARCINOGENIC TO ANIMALS.

THE SUGGESTED REMEDIES ARE INEFFECTIVE AT BEST, AND
BYPASS AN OBVIOUSLY MORE EFFECTIVE AND ECONOMICAL
SOLUTION AT THE LEVEL OF THE INDIVIDUAL HOMEOWNER (i.e., the
computerized water filters at the intake level of the water into each home).

THERE ARE "NO PESTICIDES" FOUND IN THE SAMPLES, EVEN

THOUGH THE EPIDEMIC OF BREAST CANCER IN LONG ISLAND *ITSELF*

PROVES THAT SAID PESTICIDES ARE IN THE WATER.

LAST BUT NOT LEAST, (AS PER EXHIBIT 26), THE TESTING ITSELF

BEING DONE AT THE HANDS OF THE FEDERAL GOVERNMENT IS

<u>ACTUALLY WORSENING THE CONTAMINATION OF THE LLOYD'S AQUIFER</u>

WITH CARCINOGENIC CHEMICALS THAT ARE NOW BEING DISTRIBUTED

IN THE WATER OF THE ENTIRE ISLAND VIA LLOYD'S AQUIFER.

OMEGA

IN SERVICE TO THE TRUTH TO THE PEOPLE.

JOSEPH SADOWSKI

30 MURRAY ROAD

HICKSVILLE, NEW YORK 11801

516-935-4176

REBECCA CARLEY MID

9 SUTHERLAND ROAD

HICKSVILLE, NEW YORK 11801

516-433-0774

RESPONSIVENESS SUMMARY

Appendix E

Transcript of The August 15, 2000 Public Meeting For The Hooker Chemical/Ruco Polymer Site Proposed Plan

MS. ECHOLS: Good evening. We're ready to start.

My name is Cecilia Echols, and I'm with
the U.S. Environmental Protection Agency and I'm
the Community Relations Coordinator for the

Hooker Chemical/Ruco Polymer site located in

8 Hicksville.

On our agenda today I'll be your moderator, and we have Kevin Lynch, he is the Chief of the Western New York Remediation Section; we also have Marla Wieder, she's the Assistant Regonal Counsel; we have Kent Sorenson with Integrated Earch Sciences; Steve Sharf and Walter Parish with D.E.C.

The purpose of the meeting today is to discuss EPA's alternatives for the groundwater clean-up at the site. The community relations program is a program where we have the decision making process from you all, and we bring you all into helping us clean-up the site, so we like to hear back and forth from you during different stages of the clean-up of this site.

We have an information depository, if you're looking for any information pertaining to

this site you can always go to the Hicksville Public Library.

Once we receive all comments here at the meeting or in writing, there will be a response summary developed, and then, hopefully, a record of decision will be signed by the regonal administrator.

We have a stenographer here, at the end of Kevin's presentation we will open up for question, and please state your name clearly so he can get it accurate for the record.

I hope everyone signed in so I can add you to the mailing list and give you an update on what's happening at the site.

MR. LYNCH: As Cecelia said, my name is Kevin Lynch, I'm one of the section chiefs at the Superfund branch in New York City. What I will do is give a quick synopsis of the law, the Superfund law we work under, a history of how it came about, a quick runthrough of our regulations require us to address the site, then a summary of the proposed plan, a summary of what we found out at the site, and run through the alternatives we've looked at, to the remedial

12 ..

alternatives to remedy the situation, and then we'll present the final alternative and look for your comments on it.

In 1979 a number of environmental disasters occurred, the best of which is Love Canal, where people found that they were on an abandoned hazardous waste site. Another one you may be familiar with was the chemical control site in Elizabeth, New Jersey, which was supposed to be a hazardous waste incinerator, but they never burned anything, they just collected drums from people, took the money, they collected tens of thousands of drums that did catch fire one night.

The Federal Government discovered this time that they had no way to address environmental disasters; the Love Canal was addressed was through a presidential declaration just similar to a declaration of disaster for a hurricane. So in 1980 congress passed the Comprehensive Environmental Response Compensation and Liability Act, the acronym is CERCLA.

And what this act did, it gave us authority to take actions at hazardous waste

sites in environmental emergencies, it let us take actions in two different ways. One, it let us take an emergency response action, this would be an action to take where, if something was on fire, we could pay to put it out, if we discover a warehouse full of drums that is a fire hazard, we can clean that warehouse out of drums, when we find a community with a heavily contaminated water supply we can supply alternate water.

They've created a way for pay for this, they created, at that time it was a 1.6 billion dollar fund, which was called the Superfund, which is what the law is commonly called, the Superfund Law. That's a lot of money, but there were a lot more sites out there than anybody thought there were, so the money doesn't go that far to clean up these site.

The law also gave us another way to approach it, to have someone else pay for the site, and that's how they get what is called the potentially responsible party pay for that. And that can be the people who either owned or operated the site, it can be the generator of the hazardous substances that are causing the

problem at the site, or it can be the transporter who brought those hazardous substances to the site.

In addition, we can have any of those people perform the studies and the cleanups, or what we can do is we can go spend the money from the Superfund, and then we have the authorization to go after them to recover the money that we used to pay for it.

Besides these emergency removal sites, we have the authority to do what we call a remedial site. What this is, these are for the bigger, long term clean-ups, looking for a more permanent clean-up. When the site is discovered, most of the sites that we get are referred to us by the state. We do what's called a preliminary assessment and a site investigation, which is gathering the information that already exists on the site, the state usually has a lot of information as to why they think the site is a problem; the site investigation, we can go out and take samples of the waste, of the hazardous substances to try to determine what's out there. We also get

information as in where the closest water supply it, what the population is; this all goes into a mathematical formula and it comes out with a number. If it gets above a certain number it goes on the National Priorities List, the national priorities list is trying to arrange the sites so that we would address the worst sites first, if it goes below that number it goes back to the states, and the states usually handle it, New York State handles it with the state Superfund.

Once it gets on the National Priorities
List and we can spend Superfund monies to clean
up the site, we then do what we call a remedial
investigation and a feasibility study. The
remedial investigation is a study where we go
out, take samples of the soil, take samples in
the surrounding community and on the site, take
samples of any waste or hazardous substance on
the site, we also put in monitoring wells to
measure what's in the groundwater and to find
out where the groundwater is moving.

What we're looking for is we're looking for what's on the site, where is it going and

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what problems is it causing, what are the potential problems it can cause if it hasn't caused them yet.

We then move into the feasibility study stage, and what the feasibility study is, it's a study of various alternative solutions to the site that we compare to one another and we use criteria that the regulations require us to look for to compare one site on the other.

There are nine criteria, the first one is overall protection of human health and the environment; we are not allowed to select a remedy that doesn't protect human health.

Compliance with ARARS is the second, and ARAR is an applicable or relevant and appropriate standard of regulation. What this means is there are regulations out there that you have to follow that are directly applicable to whatever you are doing. For instance, if you're discharging water there are water regulations that you have to follow.

We obviously have to follow those, but this make us go one step further. If there are regulations that would make sense that we do

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follow, but since this doesn't fit in the exact nitch that the law was written for, we still have to follow them.

We look at the long-term effect in this, we're looking for something that is going to work in the long-term, we don't just want to put a bandaid and walk away from it and have a problem crop up later. We look for the reduction of toxicity, mobility or volume at the site by treatment. We also look at the short term affect, and what we look at there is we want to make sure that what we do doesn't cause a bigger problem in the short time while we're trying to solve a long term problem. An example of this is you don't want to do things, like dig things up and expose the population to it that could cause problems because you dug it up that didn't exist if you treated it some other way.

Implementability. It has to be something we can do. It sounds like a great idea, but if you can't go out there and do it it's not going to work. We look at cost, we look for the state acceptance and we also look for community acceptance.

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2 3 4 5 6 7 the public. 8

How we determine if we have community acceptance is the process we're going through We take the information, we put it into a proposed plan, we propose that proposed plan, hold a public meeting and look for input from That input is both in the form of comments that you will give us today and also in written comments.

The proposed plan is in the back, if you don't have a copy you should get one, and in the proposed plan is the address and the name of the person you should be sending written comments to, and we encourage you to send those comments.

The Hooker/Ruco site is a 14 acre site in It is bordered on New South Road Hicksville. and the railroad, immediately to the east of it is another hazardous waste site, the Grumman It didn't come out that well in the site. slide, but it is the largest site outlined in the green, and the Site Number 3 here is the Navy site, which is another hazardous waste site. Neither of these sites are National Priority List sites, they are being addressed under the state authority, under the State

Superfund. We are coordinating our actions with them, but the site we are here to talk about is the Ruco Site.

The facility began operations in 1945, and they continued in operation, what they do is they manufacture resins and polymers, basically raw material that others take and make plastics and a lot of other consumer items from. It's been operating, as I say, since 1945. When it commenced operation, and up until the '70s, it disposed of its waste through various sumps on the site. Since 1975, however, all of the waste from the site has either been treated on the site or shipped offsite for treatment and disposal.

The site was placed on the National Priorities List in 1986. In 1988 the Occidental Chemical Corporation, which is the former owner and operator of the site, agreed to do the remedial investigation feasibility studies at the site.

The remedial investigation found a number of things. The first thing it found was an area of PCV contamination around the pilot plants and

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around sump 3. These are elevated levels of

PCVs we felt were hazardous to the workers in

the plant; the plant is totally fenced and not

accessible to the public, so we didn't think it

was a public problem, but it was a problem that

we addressed by doing a feasibility study on

this specific problem.

What we will do on most of our sites is we will break them up into what we call operable units, we'll go out and design a study to find out what's at the site, but when we find things out, and if it's something that we can split out and take an action on, we like to do that of waiting for the entire, for everything to be known about the site, because that can and does take years. We did that in this site, we did a focus feasibility study we at a public meeting, we made a decision to excavate the PCB contaminated soil, dispose of it offsite, there are some 3,200 tons of contaminated soil were disposed of in a TOSCA regulated landfill and about 800 tons were incinerated, 800 tons of the most highly concentrated PCVs.

We also found other areas of contamina-

tion, soil contamination at the site. We found in an area where drums with formerly disposed of there was some residual contamination, in an area close to sump 3 there was also another area of contamination, and in sumps 1 and sumps 2 there was soil contamination, the first two were near the surface, and the sumps, they were much deeper. The contamination here is a solvent contamination, it consists mostly of tetra or perchlorethylene and trichlorethelene and a number of other volatile organics and semi-volatile organics are in there.

What was also found, though, which is more significant, is that there was significant groundwater contamination that has moved off the site. The chemicals that we'll be talking about, we found various chemicals out there, but the three big actors that are out there are vinyl chloride or VCMs, vinyl chloride monomer, perchlorethylene and trichlorethylene.

The reason why these are the three biggest actors at the site is the perchlorethylene and the trichlorethylene is mostly what the contamination is, there's more of that than

anything else that's out there; we found some other chemicals that we'll be addressing as we address these, but these are the ones we're following the most.

The perchlorethylene and the trichlorethylene, as I said, because it's the most out there, the vinylchloride is also significant because it's very toxic and you have to handle it differently than you do the perchlorethylene and the trichlorethylene.

The contamination has moved off the site-- I don't know how well you can see it in this slide-- the Hooker/Ruco is up in this other corner here, the other sites are around it.

This is trichlorethylene in the groundwater and where it was in 1999. This is a compilation of the data from all three sites wherever it was found.

When the groundwater moves off the Ruco site, while Grumman was operating they were taking a lot of water out of the aquifer for their production, they were averaging more than 6,000 gallons per minute, and that had a big influence on all of the groundwater around it.

When the groundwater would move off the site it would tend to be pulled over to Grumman, where it would mix with the contamination from the Grumman and Navy site, and there's trichlorethlene and perchlorethlene, once it mixes up like that, you don't know who's contamination is who's, so it's just one big regonal problem.

The general groundwater flow in the area is to the south. So if there's no one out there pumping, anything you put into the aquifer should be moving down. The pumping in the Grumman only accentuated that from the Ruco site, it pulled it down and more to the south.

We had made a decision, we slid off the site into another operable unit, we had made a decision to address the soil contamination and some of the groundwater contamination, the soil contamination by excavating those two surface areas, the deeper sump contamination we were going do address by flushing water through that and collecting it on wells that we were going to put in right at the edge of the Ruco property; this is to prevent anymore contamination from leaving Ruco and to collect that groundwater

that we're going to put in to clean the things out of the lower sumps.

What we also needed at that time was more information, moving to the west of Ruco, as to where the contamination was. As I said, we expected that it would move south and move to the east, but we had not defined a clean line to the west of the site. So we also went out to the west of the Ruco site an put in another series of monitoring wells to make sure that the theory was right and things weren't moving off to the western direction.

As we were doing that, the state came to us and had some suggestions how we could better coordinate the studies at the two sites. At that time they were discussing with Grumman the installation of what they call an interim remedial measure. This is a measure that's designed to go out and prevent the problem from getting any worse, hopefully make the problem better. What they were discussing is putting in a series of wells, or actually they're existing wells, but pumping these existing wells, there's well GP-1, there's CNCT-1, 2 and 3, and pumping

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them and treating that groundwater so to prevent anymore migration of contamination from the Grumman site, it what this will do and what it is actually doing, it is in place and working now, and it is preventing any of the contamination from all three sites from moving south down through the aguifer.

The Ruco site presented a problem with this, though, is that Ruco does have a-- this is contamination that's coming out, the chemicals the vinylchloride that I mentioned before acts differently than the perchlorethylene and the trichlorethylene. Again, this scale is tough to see this, but the Ruco site is here and the small green area is a plume that contains vinylchloride. As I say, most of the contamination, you can't tell one from the other, but this is a plume that comes out of vinylchloride that you can attribute to Ruco alone. It hasn't moved as far off the site because of the properties and because of how it reacts in the environment, but the problem it does present is that it cannot be treated the same way as you treat the perchlorethylene and the tetrachlorethylene.

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The treatment that is used in the IRM is water is collected in the four wells, it is then sent to a treatment system where the treatment used is air stripping. The water comes to the surface where you pass water, an air stream through the water, and what happens is the chemicals volatize into air from the water, you then collect the air in a carbon treatment unit, the chemicals cling to the carbon, the air comes out clean, the water comes out clean, and you dispose of or regenerate the carbon.

The problem with vinylchloride is that it doesn't adhere to the carbon the way the tetrachlorethylene and perchlorethylene does, so that if the vinylchloride migrates down to these wells and into that system, it would go through the system without being treated and would be exposed to the air and discharge to the air above standards, and this would create an unhealhy situation. So what we decided to do about this is that we decided since basically the problem on all three sites has mixed together, is that the EPAs feasibility study will concentrate on that vinylchloride plume,

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and remediating that problem where the state's feasibility study will look at the bigger picture of the plume that has extended down the entire length of the site.

We've looked at a number of different alternatives for the vinylchloride plume. of the things that we have to look for through the regulations is a no action alternative. We have to look and see what happens if we don't do anything out there, are things going to get any worse? Well, we've looked at this, and as we said before, we know that this isn't protective because it's a vinylchloride, when it gets down to these wells it will create an unacceptable What it also, then, has us do is compare risk. all of the other alternatives, this is the baseline of what happens if you do nothing, and you look at other alternatives where you do take an action.

The first alternative we looked at was a pump and treat alternative. The technology is similar to the IRM that's operation now. The vinylchloride is depicted by these irregular circles, what they are in different depths of

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the aquifer. We would put one into the most concentrated area and two wells at the leading edge of the plume. We'd pump those wells to contain the plume and collect the contamination, pipe it back up to the Ruco facility where we would build a treatment plant, we would use a different treatment system, and it would be one that would burn off the vinylchloride so it wasn't put out into the air; the air discharge and the water discharge would meet all applicable standards. And this would also, we wouldn't just be cleaning up the vinylchloride with this, we would be cleaning up any contamination that would be in this area, in this small area. It would still need this IRM to operate to take care of the rest of the problem.

In order to clean up the vinylchloride to drinking water standards, which are the standards that we use for the water in the aquifer, the idea of anything we do here is we're trying to restore that aquifer to drinking water quality, and to do that we calculated that we will have operate this system for 30 years

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and it would cost some 13 million dollars to do so.

The other alternative we're looking at is 4 5 a bioremediation alternative, and what the bioremediation is is taking advantage of 6 nature's ability to clean itself, and we look 8 out there and see what can we do to help it. 9 There's a natural process of breakdown in 10 chemicals when they get in the environment, this 11 is the chain of tetra of perchlorethylene, what 12 it would, if it goes through its whole process, breakdown to. What we've done is gone out into 13 14 the vinylchloride plume and measured what's out 15 there to try to determine is this happening? 16 Well, since there have been perchlorethylene and 17 trichlorethylene, vinylchloride and to some extent the dischlorals, you really can't tell 18 19 one is coming into the other because there's so 20 much out there.

One thing we have seen, though, is that a ethene and ethane out there, but it wasn't discharged out there, so we believe the vinyl-chloride is breaking down. And how this breaksdown, it's a natural process, but the

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process is done in the presence of oxygen.

Basically there's a bacteria that will digest

the vinylchloride, but they need air to breathe

in order to work, so they are breaking it down

some, but they're also using the air that's in

the formation, when the air is gone, the oxygen is gone, well, it stops working and the

9 vinylchloride continues to migrate.

The technology that we looked at is something called biosparging, and what that is is that you replace that air that is lost. points in the plume now are wells, but what they are they are injection wells. The idea is that you place wells into the area that has the vinylchloride and you inject air to replace the oxygen that's being digested by the microorganisims. You go out and do this in steps, you do a pilot study first, you put in a series of wells, three to six wells, and you vary the amount of air you put in until you can measure what kind of an effect you have, how many wells you have to put in, how far can you push that You also, though, have to be careful that you don't put too much air in, because what you

don't want to do is rush air through this and work like an airstripper that can take the vinylchloride out of the water and then put it up into the soil gas and thus into the atmosphere. So you go out there and study on a small scale to find out what's the best parameters, you design the full scale study and you operate it.

And this, though, only addresses the vinylchloride, the TC, PCE that's in this plume also, then, would rely on the IRM to full remediation. In order to remediate the vinylchloride so that it will not get down to these wells in a level that would cause a problem, we think it would take 10 to 12 years, and this would cost about three and a half million dollars.

We've taken those alternatives and once again gone gone through those nine criteria that we talked about before. And when we've gone through those criteria we've come up with a proposed plan, a suggested alternative that we believe should be selected for the site, and that is the air sparging alternative. When you

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look at both alternatives they both are protective of human health and the environment.

One thing that I neglected to mention, I forgot to mention when I told you about the state's IRM, that was the second IRM that was done at this site. Earlier, what they did, the Navy and Grumman, through the state did, is they made available treatment to the Bethpage wells that were downgrading from the site to make sure that no one would be drinking contaminated water from the Bethpage wells, some of the deep plume has reached some of those wells, but all the wells do have treatment on them.

So currently the risks that are out there are all potential risks because no one is drinking contaminated groundwater. But as the overall protection of human health in the environmental, both the air sparging and the put and treat are equally protective, they rely, a lot of it, though, on the IRMs that are out there, also. The compliance with ARARs, they are both designed to meet all air emission standards, all water discharge standards and eventually they're designed to clean up the

aquifer to drinking water standards. The long-term effectiveness and permanence-- for anything to be long-time out there, it's things are going to have to be operating and pumping and controlling that plume somewhat for 30 years. So in that they're both pretty much equal on both of those.

The reduction in toxicity, mobility of volume through treament. Well, they both reduce the toxicity through treatment. The biosparging will be reducing the toxicity of the vinylchloride by the bioremediation, the pump and treat, though, does reduce the toxicity of more chemicals since it treats everything in that plume of vinylchloride, not just the vinylchlorides.

The short term effectiveness, we think this air sparging has an advantage in the short term effectiveness as you're not bringing anything up to the surface to treat it; what you're doing is you're treating it down in the subsurface where no one is being exposed to it. The pump and treat alternatives bring the water with the contamination up to the surface.

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Although we don't think it's a real big risk, pump and treat systems are out there and have been used for years and they're operated very safely.

Implementability, it's actually easier to go out in the field and put in the biosparging unit, it takes less equipment, you bring equipment right to the area where you're going to be doing biosparging, the wells are easier to put in, they're smaller wells. The pump and treat system, you have to put in the wells and then you have to put in the associated piping to bring it up to the facility, and you also have to build a treatment plant. So the biosparging can be installed quicker, and it's a little bit easier to implement; it is a little trickier, though, to operate, because as I said, you have to continually monitor it to make sure that you are putting enough air in so that the system is working as it's supposed to, but you're not putting too much air in that you're blowing the vinylchloride up to the service.

Both of these remedies include monitoring. Either remedy that we would choose

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we would install monitoring wells, downgrading that vinylchloride plume for a couple of

4 reasons, one is to make sure it's working.

5 They're both designed to stop the vinylchloride

6 plume from migrating down to those others wells,

7 the monitoring wells that were put in will

8 measure the air so we know we're not being

successful, and the other thing it does, it

10 gives an early warning to those wells

downgradient, where if these don't work the the

vinylchloride continues to migrate to those

wells, well then you can put treatment systems

on those wells before the vinylchloride is

brought up to the service and put out into the

16 air.

The cost, the biosparging has a big advantage in cost, it costs 3-1/2 million dollars versus 13 million dollars for that treat remedy.

But getting back to the implementability of it. The biosparging is an inovative technology, this isn't something that's been around and being used for a long time, it's being used more and more in sites around the

country, people are finding out that this works and that it's effective. But in the region, we don't have one yet, but we have completed it and walked away and said we have been successful.

So what we're recommending is that we choose the bioremediation, but there's a contingency in our remedy, and what that congingency is is that we would go out and design the remedy, implement the remedy and then monitor it very closely, and if the vinyl-chloride does not stop the drop as designed in a pretty short timeframe, we would then go right ahead and put in that pump and treat technology.

So it's something where normally if we would pick a remedy and it doesn't work, we would then have to go back through the system and go to the proposed plan together, look at the-- do a feasibility study and a public meeting. In this what we would say is we're going to do it, we believe that this will work, but if it doesn't we won't hesitate to go to pump treat.

The state acceptance, the state has concurred with our approach, especially the

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contingency approach, they think it's the right way do do this, they think it's a good mix with us taking care of the vinylchloride, with the biosparging while they address the larger plume. They also like the idea, though, of a contingency that if this doesn't work we can get out there more quickly than we normally would in

order to put another remedy in.

And the community acceptance is what we're looking for today, we're looking for your comments, for your questions, as I said, both comments here at the meeting and written comments will come in. There is a depository that Cecilia mentioned in the Hicksville Library that if you want to know in more detail the studies that have been made and look at those studies and have comments on those, we would also encourage you to do that.

At this point I would like to open the floor to any comments or questions.

MR. SIDOWSKI: My name is Joe Sidowski.

On your figures, which would be your Exhibit Number 1, if you go to 4.2, you come up with Regional Ground Water Division. Do you

MR. SIDOWSKI:

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I've been studying this

installed by the Navy, monitoring wells

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installed by Northrup Grumman, monitoring wells installed by Occidental, and there are different reports and different samples at different times, sometimes it can get very confusing. I think the N wells are Nassau County wells, those are associated with wells that are put in by the county to monitor the groundwater.

MR. SIDOWSKI: Then we're dealing with an N well here, then?

MR. SCHARF: Right; that N well.

Now, you mentioned something about some figures showing the groundwater moving east-west, others north-south, others showing the contamination moving down. I think one of the things that Kevin had mentioned is that over the last decade, as the Grumman facility shut down, they changed the rate at which they were extractin groundwater. Back in, let's say they had full production in 1990, they were pumping out, what was the rate, about 6,000 gallons a minute, and what happened is a lot of the contamination, rather than moving the normal flow, was moving either directly down or moving to the east, towards the Navy facility, and that

2	ended up drawing some of the vinylchloride onto
3	the Navy property and Grumman property. That's
4	where you may be getting confused
5	MR. SIDOWSKI: No, I'm not getting
6	confused, you didn't hear where I'm going yet.
7	MR. SCHARF: You're right, I shouldn't
8	say "confused."
9	MR. SIDOWSKI: I'm using that particular
10	well right now as reference.
11	That particular well, going down to the
12	150 foot mark, 135 foot mark, you have dense
13	clay, and that runs down from 35 to 45 feet.
14	Now, this is at a peak, this is at the east side
15	of the Hooker site, and right in the middle of
16	the Hooker site you have the drain line, the
17	movement line where your water goes down.
18	MR. LYNCH: Actually no, that isn't in
19	the middle of the Hooker site, that is to the
20	north of the Hooker site.
21	MR. SIDOWSKI: It's right here; that's
22	why I said put it up and you'll see.
23	MR. LYNCH: I don't have an overhead of
24	everything.
25	MR. SIDOWSKI: Anyway, that's running

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back towards our plant over on Murray Road; now that is only one quarter of a mile away from this particular site. I know, I live on Murray Road.

All through this book you find where, whoever did the report, you will find that plant number 9, Elisia Street, is on the west side of the railroad. According to the information in this book we have plant number 9 sitting east of the railroad. This is just one incident.

When dense clay is involved, and, of course, we all know water runs like a root to find it's easiest path, and it won't move. You can drill holes all day long and not find it, but then you'll find it. When you get into one of these roots, one of these pools, you'll be able to test, and when you test you'll be able to get levels.

Now, going into a time when we have heavy rain, okay, the contaminants can only spread, because you have a 35 foot dense clay backup from the top of that underground river going. north or upward; right? That would mean that all that water can only run back to the north,

over the lip and come back down towards the centerline. This is the very threatening study, I enjoyed it.

MR. LYNCH: I think you're misinterpreting the data that is in the study, though.

MR. SIDOWSKI: That is what?

MR. LYNCH: I think you are misinterpreting the data that is in this study.

MR. SIDOWSKI: According to a couple of people, we've been been sitting down and reading these thinks, we have the site here, you have the site map on your next page here of all of Long Island, Figure 4.3.

MR. LYNCH: It's very hard for me to follow--

MR. SIDOWSKI: You are here to fix the problem that we have, and we have a problem with contaminated water in our main quarry; okay, because of this own report here that clearly shows regonal groundwater division, our polluted problem is right next to it, and that's the only place where the water can actually go straight down, start to divide, or then therefore divide. If we are then at that place, on that hill, and

MR. LYNCH: Okay.

MR. SIDOWSKI: We've got seven levels that drop off of water, and water pools in veins. As you get down to the last level, number 7, you have on the west side, you have it

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falling down into the quarry. Why? Because we're near the centerline.

I dig wells.

MR. LYNCH: I'm not a geologist, and I would like a geologist to interpret this, but this does not show that the contamination is going to--

MR. SIDOWSKI: You see that little circle there on the left side?

MR. LYNCH: Yes.

MR. SIDOWSKI: It says model layer 7. It has 495 feet to 610 feet. See the little circle right at the bottom? That shows a pool, the outside of a pool. And that pool is going west. As this water is dropping you can actually see the water falling down towards the west.

MR. LYNCH: Actually what this is, this isn't necessarily a pool. What these lines that are on this thing are contour lines. What you do is you look at the different points that you get, the spots that are there are wells, and what you try to do is interpret, you look at how much, what the level is in that spot, that blue line is the contour of, I think it's a 10 part

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per billion contour of tetrachlorethylene, and what you do is you take all of the information that's out there and you try to make sense of it to see where things are moving and where it's gotten.

MR. SIDOWSKI: And that shows where it's traveling. That would mean that the water is traveling that way.

MR. LYNCH: You also look at the water levels and see which way water is traveling, and at this area of the site the water is not traveling to the north, it is traveliong to the south.

MR. SIDOWSKI: If you go back to the original chart that I sent you, it shows you exactly where the water is traveling on here; you have to pull that out right here.

MR. LYNCH: What was that one, again?

MR. SIDOWSKI: Okay. WA002, and that's drawing number 1, that's the big drawing; that would be in the back of the book, folded.

MR. SCHARF: I think that what you need to do is look at the overall hydrogeology of Long Island. In general the clay lens that you

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2 are talking about were various deposits over the glaciation period over the last 100,000 years, 3 if you want to believe the way layout was 4 5 supposed to happen. The permability layers 6 slant towards the Atlantic Ocean, and in the 7 area of the Ruco site, the Northrup Grumman and 8 the Navy site, the ground water is moving to the 9 the south-south east, general trend. And the 10 area of deep recharge you're talking about is 11 further to the north, it's somewhere around by 12 the Long Island Expressway, and that's got to be at least 2 to 3 miles to the north. 13 long distance away, and that's what I was trying 15 to explain before, it can get a little confusing 16 when you look at the end result from the wells, 17 and some of them are taken at different times, 18 and its hard to figure out a trend. And that's 19 why, for instance, on the Grumman site we 20 started up a quarterly monitoring program to try 21 and get data that's current, and you want to 22 look at the groundwater elevation data, we put 23 together the direction the groundwater is 24 flowing, plus the current condition of the 25 groundwater, and the geologists have looked at

these repots and found that the groundwater is moving to the south-southeast, especially now that the Grumman Corporation has stopped pumping most of the water from their site.

And so you're right, that's just a generalized figure of the overall hydrogeology of Long Island.

MR. SIDOWSKI: You're talking about contaminated areas is a generalized area, too.

MR. LYNCH: Yes. And actually I do see now that the figure you're talking about is--

MR. SIDOWSKI: With heavy rains, any time that we have storms or heavy rains, what happens is that would back up, just like a door that would be closed, that could not hold all of that water coming down.

MR. LYNCH: Yes.

MR. SIDOWSKI: We now have a condition where that water has to spread out.

MR. LYNCH: Right. But the one thing on here, if you look at the rest of them also, there is not a continuous band of clay that would prevent the water from coming down, there would be little pockets here and there, and what

happens is the water does go down and go around it; this is an unconfined aquifer, it is not a good clay layer—a good clay layer we'd like to find because then you could just keep the contamination on top and catch it. But it has gone down, and gone down almost to those levels.

MR. SIDOWSKI: If we read all the other ones, the MW-54, MW-55, you read all of them you can get all the levels of what you have here; sand and gravel, gravel, sand, right down the line here, you have a potential hazard to see which way the water is moving. It's got to go someplace.

MR. LYNCH: And in general it does go down and it moves through— this is not a confined aquifer, it does not move in like a fractured rock where it could move through one fracture, this is a general groundwater flow and the water does flow.

MR. SCHARF: Long Island is basically an underground river full of sand, and the water that percolates down through the it from the recharge basins, it takes time to get down there. The groundwater levels can fluctuate by

1 2 season, but not that much. Basically in this area it's about 55 feet, the groundwater, and a 3 five inch rain hits the recharge basin, the 4 5 water slowly works it's way down. So by the 6 time it gets to the watertable, which is about 60 feet down, it might increase the level all 8 around on Long Island maybe a foot or two, 9 depending on where it's being drawn, but overall 10 the trend is well documented, especially in this area, it's been well studied in the last ten 11 12 years by Northrup's consultants, by Navy's consultants. 13 14 MR. LYNCH: So what you're saying is a 15

plane of clay and the water is going to spill off.

MR. SIDOWSKI: You're right. These are the people who creating the contaminants. You're right.

Try and keep your questions MS. ECHOLS: If you have any detailed questions could you just hold them to the end?

MR. LYNCH: We can come back and address this at the end. It's easier to talk about it with the things in front of us.

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MR. DEVINE: My name is Dan Devine.

I want to thank Mr. Sidowski for being a concerned citizen and for investigating and researching the background. I also want to thank the law for allowing public participation in this process, and I appreciate you all being down here.

I just have maybe three questions. One is who makes the decision as far as what method is decided? I mean I can go down and complain about the rates of the buses going up, it's a public authority that makes the decision. The second thing is what exactly is the product that vinylchloride is, what kind of products does vinylchloride make. And three is is Hooker Chemical Company, are they still making these products; and then the last question was that are businesses and is my local government invited to participate in this sort of thing? Were they invited to be included and they decided not to attend?

Those are my four basic questions.

MR. LYNCH: The first question is who does make the decision in this case is the

2 Regonal Administrator in New York, he's the head of the EPA region. All we will do is present to 4 her all of the data, basically the proposed plan, and then the record of decision which is 5 6 in more detail, we'll also present to her all of 7 the comments that people have made, all of the 8 questions they have asked and our responses to 9 those comments, and also our recommendation, 10 whether the preferred alternative is the one 11 we're still recomending or if we change it based 12 on these public comments. And she will 13 eventually make that decision. 14 MR. DEVINE: The VCM, the vinylchloride, 15 what did Ruco make that's made of vinylchloride? 16 Is that vinyl in cars or what product is made from that? 17 18 MR. LYNCH: In the past--19 MR. SCHARF: PVC pipe.

MR. DEVINE: Pipe for plumbing?

MR. SCHARF: All sorts of purposes.

MR. LYNCH: PVC was a very well used

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24 that would be in cars and pipes.

25 MR. SCHARF: They also made specialty

and also the state and the federal congressman

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often do comment on these plans and talk to our administrator all the time, and we will respond.

Believe me, one of the most important things we get inquiries from the elected officials, they make sure we respond.

MR. GILDAY: My name is Bill Gilday, I'm with the New York State Department of Health, and I'd just like to add to that, that the Water Districts, Bethpage Water District, Hicksville Water District and Levittown Water District have been involved on basically what was called a technical coordinating committee for a number of years as the regonal groundwater was being studied, and they all were either were in attendance or had representatives, some of their consultants, engineering firms were at these meetings. So the water districts, too, got involved through the process.

COUNCILMAN MACAGNONE: Councilman Macagnone, Town of Oyster Bay.

Recently I'm seeing finally some progress in cleaning up the Liberty site after 18 some odd years of promises. What time frame are we looking at in this project?

MR. LYNCH: This project, we have a 30 day public comment period, if it has to be extended it would be a 60 day public comment period.

COUNCILMAN MACAGNONE: We had that 18 years in Farmingdale also. What's the time frame?

MR. LYNCH: Were intending to sign the Record of Decision on this site before the end of September. We then go to the responsible parties and ask them to perform the remedy. We have 120 day negotiation period. If they agree, we then take a little bit more time, probably another three months to negotiate a consent order that would be lodged with the court, at that time we would go into design, design should take six to nine months in this system, and after that nine months we would go out and implement the system. So it would be roughly a year and a half from now is when we hope to be out there.

COUNCILMAN MACAGNONE: Thank you.

MR. LYNCH: Yes.

MS. TUECHLER: I'm Irmgard Tuechler. I

walked around protesting the plant when it was still in operation 18 or 20 years ago, also.

Has it been going on this long?

MR. LYNCH: Well, the site did get listed on the National Priority List in '86, so we have being trying to address this for some 14 years now.

MS. TUECHLER: Okay. Just because it was brought up about Farmingdale, you mentioned that, but I would like to know what health studies have been done, the incidents of cancer in Hicksville and Bethpage, and also how this relates to the mapping of the breast cancer on Long Island.

MR. LYNCH: The EPA doesn't do health studies when we're looking at the sites, we just look at the environmental problems; you could ask the Health Department.

The ATSDR, the agency for Toxic Substances Disease Registry, does look at these sites and does do a health assessment, but they do not go to the level of the study of cancer incidence or things like that.

MR. GILDAY: I'm going to give you a

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1-800 number and a person's name who can tell you the various studies that have been done or in the process of being done in the area as far as small area studies, I know, related to the Old Bethpage landfill, there have been two studies, and that's part of a greater study about landfill gas. There have also been studies in South Farmingdale, North Massapequa, and I know there is a study in the Levittown area there's been ongoing, it may be nearing completion. I will give you, in fact I'll give you two names. One person who knows the local area studies and one person who's involved with the cancer mapping initiative in New York State, and she can answer those questions, either of those.

MS. TUECHLER: You don't know off the top your head if it's affecting the health of the people in Hicksville?

MR. GILDAY: In order for some health effects to occur from a chemical there needs to be exposure to a chemical, and the exact route of exposure here might be the groundwater contamination issue through the drinking water

2	supply. Historically some of the Bethpage wells
3	did have concentrations of volatile organic
4	compounds in them that were distributed to the
5	public water district prior to 1976, that's when
6	testing began, and that's when the science was
7	actually available to start looking at these
8	chemical at very low concentrations in the
9	water. The concentrations at that time were
10	lower than what the Health Department and some
11	of the other agencies had as far as the drinking
12	water guideline. That number has since come
13	down, and those numbers that people were exposed
14	to historically in Bethpage are at least
15	associated with one particular well at one of
16	their I think they had nine well fields
17	historically. Those concentrations, although
18	they were below the standard guidelines at the
19	time, they are above the present drinking water
20	standards. How long people were exposed or what
21	concentrations we do not know. It's my
22	understanding that through a number of the
23	studies that have been done, there haven't been
24	any inceased incidences of cancer noted in that
25	area. But one of the things we're doing in New

2 York State, as Kevin mentioned, the ATSDR and assorted interfaces with the cancer map 3 initiative. We have a VOC registry, volatile 4 5 organic compound register, and people who may 6 have been exposed or definitely were exposed to 7 volatile organic compounds for some period of 8 time, we're putting these people on a registry, 9 small groups of people or entire communities that may have been exposed, and over time we'll 10 11 be able to see if, in this group or these 12 groups, where we know there was exposure, if 13 there is any kind of increased incidence of 14 various, either cancers or different types of non-cancerous disease. 15

I'll give you Lorraine Benton's name. In fact I see people taking notes here.

1 800 458-1158, and do extension 2-- you can get information about that from there.

VOICE: I have a meeting, I believe, like September 19th.

MR. GILDAY: Use extension 2-7530 for local area studies that have been done or are being done, ask for Lorraine Benton; and for the cancer initiative, the mapping of cancer

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surveillance initiative it would be Gwen

Mergian. And they would be able to speak to

these issues a lot better than I can.

You could also call me at extension 2-7880, and my name is Bill Gilday, and I know more about the nuts and bolts of the contamination and the site and what's going on, and I work with Steve of the D.E.C., and we interact with the EPA, too.

So those are the three names and they would be interested in talking to you.

MR. SIMONELLO John Simonello from Hicksville

I have a couple of questions. Number one, you mentioned a plume of contaminated water, and what I would like do know in reference lines of New South Road and Stewart Avenue and Old Country Road and 107, the width and lenth of that plume. That's one part. And the second part is, as we all know, anybody can tell you this, PCBs are airborne. Over the period of all these years has anybody gone around and taken soil samples of the surrounding neighborhoods off the site? Because PCBs are

airborne, as you know.

MR. LYNCH: I don't believe we have taken any samples off the property, what we do is we take samples starting with the contaminated area and go outward until we don't find it anymore.

What we've also done now is we have taken air samples while we are doing this work while we're putting in wells.

MR. SIMONELLO: I'm not talking about air samples presently, I'm talking from 1939 to 1976 or '45, whenever it started, to 1982.

MR. LYNCH: Form 1945 to 1975?

MR. SIMONELLO: In 1975 there were contaminants dispelled into the air, they had an asbestos brake shop on that road over there, they had the plastics plant, the Ruco plant. They've had many different types of operations there, and Grumman, and whatever came out of those stacks before they came in with the filtering systems on the stacks was spread out on the surrounding community. Now, it goes up, and it might just clear the boundaries of the land and then come back down again. Has anybody done a one mile perimeter around there to check

samples? I mean PCBs or whatever in that soil where people plant their gardens, their children are playing and digging in the dirt or whatever.

I mean somebody should look into that.

MR. LYNCH: We haven't looked into a widespread sampling of the soil in the neighborhoods, but what we have done is the soil that we do find on the plant itself, where we would expect the concentrations to be higher, we find large areas that are not affected, that do not have surface contamination. We just found isolated pockets of surface contamination, and that has been attributed to spills of the actual material, not anything that has come through the air.

But we will follow that out until we find a clean area, and I would expect that if it was coming down through the air it would be pretty uniform, and the closer to the stack-- actually I'm not much in that area.

MR. SIMONELLO: It disburses before it comes down.

MR. LYNCH: Okay.

MR. SIMONELLO: So you won't find it

MR. SIMONELLO: I'm not worried about that, I just want to know the size of the plume.

MR. SCHARF: Basically the entire area is well over a 2000 acres site.

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MR. SIMONELLO: Why has it taken 20 years? We heard about the same problem in the Hicksville Public Library 18 years ago. This was all discussed, and they said Superfund is in there, you don't have to worry about it, and 20 years later I'm hearing the same rhetoric, and

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the plume is getting bigger. I don't understand it.

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MR. SCHARF: If I can interject.

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The thing is, granted, we're here today and it's taken awhile for us to get to this point, and this is the final remedy for the Hooker/Ruco site; okay? There have been other operable units in addressing that. As I mentioned, the contaminated groundwater has comingled with that of the Northrup-Grumman facility and that of the Navy facility. keep in mind, partly just by coincidence, that the Navy or Grumman, and the Navy facility is operated by Grumman, has been pumping 14 million gallons of water a day, and the Grumman Corporation has been well aware that the groundwater was contaminated mainly from their sources and some from other sources. And starting probably back in the early '80s the state had approach Grumman to do something about this, and what they did was they began to clean up the groundwater that they were using for non-toxic cooling water. So even though the contamination has been around in this area for

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20 years, most of it was contained within the Grumman facility. That which wasn't contained was drawn down deeper, where the groundwater moves slower, and that's what we're tracking right now with the other site, the Grumman site and the Navy site, which we'll be addressing in a public meeting that's coming up in the near future.

So we've known about it for awhile.

In addition to that, as Grumman made a decision and the Northrup Corporation made a decision to close the Grumman facility, an IRM was implemented that Kevin talked about to contain the contamination that's still on the Grumman site by pumping four wells at the rate of about 4,000 gallons a minute. And so most of that area, that's the area under the water coming off the Grumman site, is being contained right now.

MR. SIMONELLO: You said before that's the state's problem, that's not Supervisor Fund problem.

MR. LYNCH: It's actually everyone's problem, but the state is addressing it, we're

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addressing the Ruco problem, the state is addressing the Grumman problem under our separate authorities.

MR. SCHARF: Make no mistake about it, it's a problem, that's why we're here today and that's why it's a state Superfund and federal Superfund site; we've been monitoring the groundwater, and the state, about a year ago, asked Grumman to put together a quarterly monitoring program. They were doing several distinct monitoring programs around the site, but they put one whole program together to track what's going on, where the plume is going, and we see what's on the site it being contained, we had them do a modeling, a groundwater modeling to help to prove that, as well as corroborate that with anylitical data data, and that contamination just passed the site, we are now going to address, in the upcoming remedy for the north Grumman site, and that will be a public meeting which will be, hopefully, within the next four to six weeks MR. GILDAY: Could I just over a few

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things.

During the ensuing so many years since the state got involved, a lot has happened at the property. Steve mentioned the IRM, the 5 containment of the worse part of the plume at 6 the site's southern boundary. Those systems 7 there he talked about are pumping about 4,000 8 gallons per minute. If you could see what 9 they're extracting through the carbon, they're 10 actually able to extract TCE out of the 11 groundwater to the tune of probably about one 12 drum, a 55 gallon drum, per week, maybe every 13 other week, and that's about 95 percent pure TCE 14 through the system they have. So they have been 15 taking a lot of this-- to me it's exciting 16 because I see real science cleaning up the mess 17 that has been made, and they're actually 18 extracting out. So there's a lot of material 19 that's being taken back out of the groundwater. 20 Also, the areas where the spillage had occurred 21 on and around the campus, the 600 acre campus, 22 both Navy and Grumman, those areas had a lot of 23 either perchlorethylene or trichlorethylene or even PCBs in there. They have largely been 24 25 remediated by this time; there have been

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numerous activities going on to clean up what we call source areas during the last 10, 15 years.

Another thing that's been going on, and this gets to the issue of soil sampling and the PCB soil sampling, as various portions of the Grumman properties have been closed out, there's another program called the RECRA Program. primarily are dealing with the Superfund program, dealing with what we call the hazardous waste cites. Well, there's been other areas on the plant that have had contamination that needs to be remediated. These have been done as various plants are being closed through the RECRA program, and we're actually -- the different program are in communication with each other, making sure that -- while we don't want to overlap, we do want to make sure that nothing falls through the cracks.

I can say that there have been literally thousands of soil samples taken around the Grumman area, and I've gotten dizzy and headaches going through this data, looking at it, in part dealing with the closure of potentially contaminated areas.

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There has been, in the past, I believe it was '95, when we were dealing with one of the more contaminated PCB area on the site, that was part of Plant 3 that the Nave has. When we realized that this was towards the eastern end of the plant we have actually did, the State Health Department went into some of the yards near that property, and the good news is we didn't come with PCBs in the yards there. The bad news is that on the plant there's a lot of PCB contamination, and that's the subject of an entire another remedial action that the Navy and Grumman are implementing now.

15 There's also some other studies going on, some PCB contaminated areas that Grumman is 16 17 actually delineating, the extent of it, how much 18 they're going to have to do. There has 19 definitely been a lot of soil sampling. 20 throughout what I call the campus, the Navy 21 Grumman campus, and wherever we see that data 22 getting close to the public, their homes, to 23 parks or whatever, we say you got to go offsite, 24 you got to take the soil samples and make sure 25 it's not in people's gardens, make sure that

2 people aren't close to it. So there is a lot

going on.

MR. SCHARF: There has been health studies doen by the state, all around the state, making sure of the grade of sampling.

And you've just got to keep in mind, you've heard of PCBs too, how ubiquitous it was in terms of use before 1975; almost every refrigerator had capacitators in it that had PCBs in it, diswashers, washing machines. Even back, dating to the 1960s and before, automatic transmissions in cars used, as part of this hydamatic fluid PCBs. I'm not sure of the exact date of that. But as we realized that this material didn't break down and had residual effect, that we had to stop using it, and to the best of our ability worked to clean that up, but unfortunately you may find it in certain areas, you may find that if you look hard enough.

MR. SIMONELLO: I appreciate what you're doing, but you've got to appreciate what we're going through and our frustration; okay.

MR. SCHARF: You know, I grew up on Long Island, I've been drinking this water, I raised

my own kids here. I understand that. I graduated Stony Brook, I know this is a very important issue, and the cancer question that Bill has talked about on Long Island is a paramount issue because it's apparently a concern, like it is everwhere else in the state, but there are certain elevated numbers, if I'm correct.

MR. GILDAY: Increased incidences.

MR. SCHARF: And that's a concern. And knowing that vinylchloride, the main contaminant concerned, is a known carcinogen is a paramount issue, and that's why Kevin is here to present the plan, that we don't ever want that material to be exposed, and its for the protection of human health and the environment. And we found that this chemical can be easily oxidized, and that's what the whole program is that EPA is putting forth here.

MR. YATZYSHYN: My name is Greg Yatzyshyn.

I, too, remember these two people when we demonstrated at Hooker Chemical in 1981, and as excited as you are about what you see coming out their ground, my daughter was nine years old,

she's 28 year old and married, and we're sitting here right now. This is what we're talking about when we talk about our confidence in government at this point.

I understand that you probably use the full disclosure law in having Ruco or Hooker or Occidental Petroleum let me know where the situations are, where the problems were, any type of chemicals that they used, the amounts of chemicals, and the list goes on. I read on the web site the summary your conclusion, I read all of that, and unfortunately, like I was saying earlier, you kind of beat us, you beat us to the point where we got tired of waiting and they figured we would go away, and we did, pretty much. And now we're here again. And I threw away most of the stuff; I don't know if anybody has ever seen. Has anybody ever seen this, anybody that's working on the project?

This is a book from 1980, it was down by NYPER, and it's called Toxics on Tap, Chemical Contamination of Long Island's Drinking Water. This was a 1980 book. So anything that you're telling us is certainly not a bulletin to us;

2 all right?

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My question is, and I'm sorry I threw away everything, I really did, I threw out a lot of things in disgust. But my recollection has three laytex tanks being buried on the site.

Are you familiar with that?

ile you rumrild with that

MR. LYNCH: Yes.

MR. YATZYSHYN: Was that remediated?

MR. LYNCH: Yes, they have been removed.

MR. YATZYSHYN: I'm trying to do this from memory now, I'm talking, you know, 20 years and 30 pounds later. I'm trying to do a lot of this from memory, but what I will do later, but that's really all-- oh.

My other question was is Bethpage and the other water districts, are they prepared for any situations that might arise? Is this going to be a strangle, is there going to be a problem down the road that they are not ready for if it affects this plume traveling into their drinking water?

MR. LYNCH: Bethpage has three of their wells have treatment on the wells already designed for the contamination that is here,

and then the action we will take, monitoring programs will continue to try to track and assure that things are not moving any further once these things are operating, and we're in communicate with them and they have all of our data. So there are things— everyone will know, anyone who can you be affected, before they would be affected.

MR. GILDAY: And what the state is going to be proposing shortly, and I don't want to steal Steve's thunder here, but there are contingency plans if water district wells are threatened that there needs to be some type of treatment ready to go, and typically what we do is a sentinal new or sentry wells between what we know to be the plume in those wells so we'll see it as it's approaching and have time to implement the program.

MR. YATZYSHYN: Would the Lloyd still be protected for, let's say, Long Beach? I understand that the Lloyd is protected for Long Beach? I understand that the water is protected for Long Beach and all of these other lower

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As far as depth, that is one thing that we consider; we want to profile this contamination at depth, we don't just want to capture it at 300 feet and find later on, oops, it slid by at 400 feet. So we make sure that our monitoring is down at that depth so that we

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capture the plume both horizontally and vertically.

MS. SIMONELLO: Knowing the background of this property I could never understand how they could build those senior citizen developments on the Grumman campus that you referred to, and now you're talking about contaminated soil. Was it considered when they built that, by Sunnyside?

MR. SCHARF: I think that even though that question really isn't relevant to the program of Ruco, but that's something— that would be referred to as the south end of the runway of the Grumman property, and the contamination that we're dealing with here is in the groundwater, deeper; low visibility solvents that are moving offsite in the groundwater.

MS. SIMONELLO: But you mentioned the air, that some of the stuff went into the soil

MR. SCHARF: The area where they built the former Grumman parcel, that property was sold in order to build the homes, and that was never used for industrial purposes. And I'm not up on all of it, but there was extensive testing done to show that that would meet criterion for

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residential development before it was released to do that. I wasn't working on the project at that time, it was approved, but I or Bill can find out more answers for you on that question. There was a meeting held with the citizens that live in that community and there was a lot of

data was a assembled.

9 MR.GILDAY: Well, basically there's 10 another thing. Over the years, as various parts 11 of the facility was closed out, another thing 12 was happening concurrently with that. Pieces of the property were deemed clean after certain . 13 14 studies had been done to make sure that they 15 were indeed clean, and they were delisted from the state's inactive hazardous waste site 16 17 registry. Those pieces, before they were de-18 listed, the State Health Department and D.E.C. 19 looked at certain aspects of it to make sure if 20 there was any question, is the sampling data 21 there to verify the fact this is a property 22 that's suitable for a residential development. 23 In that particular case it was a delisting 24 petition and we denied the first one, we said 25 make sure you've done soil testing, we knew that

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2 the ground water contamination was deep, in fact it's below the water table at that point, so 4 that wasn't an issue of exposure there, and the 5 the public water to the people would be provided 6 What we said, there are certain chemicals that 7 are used maybe for deicing planes, different Я glycols, we wanted to make sure that those were 9 checked, and those were tested first, and when 10 we looked at the data and was satisfied that 11 there was nothing there we went ahead with the 12 So there was special testing done in delist. 13 that particular area, as with other areas around 14 the property that have been delisted and are

being developed even as we speak.

MR. SCHARF: The groundwater there is about 50 feet below grade, and that property is now south of where this groundwater reception program is, and the area that you're talking about, I think it's called Parcel 01; is that correct, Bill?

MR. GILDAY: There's different parcels.

MR. SCHARF: In that area there are two onsite containment wells that never had very high concentrations to date, and the ground-

water in wells in that area, the shallow groundwater wells are all cleaned up. So there's no route of exposure to anyone in those homes.

And that's where that lies. But again, that's not part of this site. If you want to put more questions on that you should come month the next meeting, to the Northrup Grumman proposed plant, the overall regional groundwater program, and you can ask more of the questions on both Northrup-Grumman and Navy at that time.

MR. ANDRIOLA: My name is John Andriola,

I live at 64 New South Road in Hicksville,

right up the street from where Hooker Chemical
is.

Now, first of all I'd like to ask you when you say that you test samples of ground, how for down do you go with the testing? Just at the subsurface, or down--

MR. GILDAY: It depends on how we were concerned the contamination got in the certain place; it was from either spillage or deposition from the wind, say the question that came up earlier, we would check the surface first.

MR. GILDAY: Sure.

MR. ANDRIOLA: I think that the amount of gallonage is a million 800 thousand gallons of

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2	water. Now, where are they pulling that water
3	from?
4	MR. SCHARF: The water in those tanks, I
5	believe that the water in the tank is from the
6	tank on New Grumman Road on the former Grumman
7	property. Those come from the Bethpage Water
8	District Wells.
9	MR. ANDRIOLA: But it's only a short way
10	from Hooker Chemical.
11	MR. SCHARF: I'm not sure exactly where
1.2	their supplyline was.
13	MR. ANDRIOLA: I know, I live there.
14	MR. SCHARF: But it's not on the Hooker
15	property.
16	MR. ANDRIOLA: It's the underground
17	water is pulling from that there area.
18	Second of all, when they monitor the
19	purity of water, who does the monitoring of
20	this? Is it a private company, is it the water
21	district themselves?
22	MR. GILDAY: That's actually a good
23	point.
24	MR. ANDRIOLA: The purity of the water;

that's what I want to know.

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MR. GILDAY: The water districts in Long Island, actually I mentioned in 1976 we started monitoring, we could finally see these chemicals at lower levels, by 1980 Nassau County, and I believe Suffolk County, had a requirement that monthly or -- I'm sorry, quarterly monitoring was required for these chemicals from every public water supply well in the different counties. And that monitoring has been going on since then, at Bethpage in particular, we've got the quarterly monitoring data, we can see if there's any chemicals or not in the water. When there is a problem, some contamination, the county is required -- that's also, I should say in 1989 that became a state regulation, that quarterly monitoring must be done to these supply wells.

You have an excellent water program, both in Nassau and Suffolk County. They had implemented what later, nine years later, became the state regulation. They go beyond that now. If there's contamination in any water supply well the county will require of the districts, they will require monthly monitoring of those affected wells, and if there's treatment on the

MR. ANDRIOLA:

And another thing.

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Alona

Speilberg wants to take over. Are PRPs

contingent -- like if this goes on for the next

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ten years, is everyone going to stay clear of that property, for economic purposes, in order to avoid being liable to clean up that property?

Actually no. What we do--MR. LYNCH: that's actually a very good question-- it's one that has bothered people and it has prevented people from nominating sites on the National Priority List for that reason. But what we will do on a site, on the National Priority List site, if someone wants to come in and develop the site, which do encourage, what we will do, we will sign an agreement with them, what we call a prospective purchaser agreement, that we will not hold them liable for the clean-up at the site. Usually what-- when we do that we also get something back from them, which would be access to the site, which would be permission to monitor all the different wells, they usually do monitoring themselves, sometimes they'll volunteer to clean up a portion of the site. But it is something that has been encouraged, very much so, recently by the Environmental Protection Agency is that we do want to redevelop these sites, these sites that have

MR. SCHARF: Are you referring to the Remedial Advisory Board meeting that the Navy put on at their facility?

MR. SIMONELLO: Yes.

MR. SCHARF: That is ongoing right now,

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and the current plan is that the Navy wants to give the property to Nassau County, and they are going through different scenarios of industrial versus residential use, and if I'm correct, I think they settled on industial use of the property?

MR. GILDAY: I think so. We're still looking at it.

MR. SIMONELLO: But are they going to clean it up before they try to sell it?

MR. SCHARF: They have been in the process of cleaning up the site, and they've done a very good job of— they've emptied out all the toxic chemicals in the building, they removed soil beneath the building, they installed— over the last ten years the Navy has been making judgment on what's going on at the Grumman site; they put monitoring wells in, they've been monitoring groundwater, they've addressed the recharge basins in the back, the PCB contamination on some areas of the site, and those areas that still require remediation have been earmarked to stay under Navy ownership. So the entire facility is not slated, at this time,

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to be turned over the Nassau County.

MR. GILDAY: There will probably be site use restrictions on that parcel and limiting it to either commercial or light industrial or industrial use in general. Now, that doesn't mean that gross contamination will be left, typically what happens is you attack any of the really bad contamination, you get it, as much as feasible -- there will be residuals, perhaps it will be 20 feet down, it will be 10 feet down, it may be near the surface, and what we will often do when it gets into the development question, there will be deed restrictions, deed notifications, there will be what we call institutional controls, literal documents that we file with the county and town clerks, whoever has jurisdiction, that every property owner will know about that, that contamination is there, and the state would have to be involved in any plan to dig that up.

MR. SCHARF: Also, any time you have an industrial facility like that, and as large as that facility was, as active as it was, there's always a possibility, as detailed as the

investigation we do and an intensive as has been performed, there's always a possibility that some old tank that may have gone unidentified or whatever, and the Navy is required, by law, to come back and take care of any problems found on the site after the fact, and they make no bones about it. As long as there's a country there's going to a Navy, so that's not a problem, and that's the key.

But again, these are questions really that we should hold off to the Navy public meeting that's coming up.

MR. ANDRIOLA: I'm concerned with the groundwater right now.

MR. SCHARF: Right. Well, the groundwater, there's contamination on the Navy site, there's no two ways about the groundwater, and we're aware of it, and that's going to be part of the overall program that we're going to have.

MR. DEVINE: You mentioned disposing or regenerating carbon. What's that's all about? How do get rid of it or whatever? What's the point of that? Because they're actually talking

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about, you know, I read about the Hanford

Nuclear Waste Site, where they want to start

regenerating plutonium and stuff like that. Is

this a good thing that they're talking about,

disposing or regenerating carbon?

MR. LYNCH: This is a typical thing that's done when you're using carbon to treat either groundwater or an air problem. You can either dispose of it in a secure landfill, or what you can do is you can put it through a heat process that would drive the volatile organics that adhere to that carbon, drive them off and then incinerate them so that you can reuse that carbon again. It's not something that would be done at the site, it is removed and done in a separate facility that's designed just to do that. So it's actually a good thing, it's actually recycling the carbon for further use.

MR. DEVINE: Which process is that?

MR. LYNCH: That's the process where you would take the carbon, you would drive off the the volatiles with the heat and incinerator; that would be the regeneration of the carbon.

MR. GILDAY: Can I just add?

MR. ANDRIOLA: I have one more question.

On trichlorethylene, now we have this

22 trichlorethlene in our water supply

23 (indistinct). Now, we have this

24 trichlorethylene in our water supply. Now, is

25 this carbon filtration also taking this trichlor

MR. PFAENDER: Biosparging, it's a new technology. Is there a track record on this technology working in other areas, number one, and number two, since the water districts,

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specifically Bethpage and Hicksville, are the districts that are involved, have you had comments on this preferred alternative from those water districts, either positive or negative?

MR. LYNCH: We have not had any comments yet from the water districts, we expect them.

It is a new technology, it is being used in a number of places, one Superfund site, I'm trying to think of the name of it up in New England, in Massachusetts, it's been used effectively, but we haven't had any programs yet where we have completed it and said yes, it is done and what went into the plume is gone.

MR. PFAENDER: So is that the reason you put the contingency plan into place to go to alternative 2, which would be to pump the water out?

MR. LYNCH: That's exactly why we did it.

MR. PFAENDER: It's a "safety net." How
far will you go with the biosparging before you
decide that, A, it is not being effective in a
timely manner, and then proceed to your contingency plan?

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MR. LYNCH: We don't have a hard timeframe yet, what we'll do is look at the design,
and we'll design a time which we'll work through
there will also be plenty of monitoring wells
downgrading from the vinylchloride, and if the
vinylchloride does reach those monitoring wells,
we will definitely, at that point, show that it
is not working, that it's reaching high levels,
continuing downgrading, we would put the
contingency in.

MR. PFAENDER: Will there be a notification to local municipalities that you are going to do the contingency plan?

MR. LYNCH: Yes, we would, we would send out a notice to anyone on the mailing list.

What we will be sending out, we will be sending out a notice of progress when we are starting the air sparging, and then if we do change it at all we would also, then, be putting out a mailing saying that we are changing it.

MR. SCHARF: With an explanation.

MR. LYNCH: Well, we wouldn't have to.

What Steve is referring to is that if we do change, if we change the remedy that we

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select in certain ways, we don't necessarily have to redo the ROD we put out, what we call an Explanation of Significant Difference. Since this is a contiguous that is selected we don't have to do that, we would do it in the normal course of business, send out a notification that we're moving to the next phase.

And the other thing to keep MR. SCHARF: in mind is that the vinylchloride is substituted for VCM, it's called VCM by Occidental because they use it in monitoring to make products that may be produced by a breakdown of the products, as it's moving in the groundwater, in the natural flow, it's moving towards the on-site containment wells that Grumman has put in, and there was always a bone of contention between the two companies there, originally Grumman was saying two years and Occidental was saying seven years, and then Grumman said Occidental was there 40 years and Grumman said ten years, so somewhere in there it has moved down to deeper; the rate of flow is slower there, so it's easier to monitor and track the path. So if nothing else happens and the biosparging fails, it's

necessary, treatment can be put on the air stream of the on-site containment wells to treat it at that point. But we have a lot of time to think about it, it's not going to be tomorrow.

MR. PFAENDER: There's a follow-up on your answer.

The responsible party here would then still be Occidental if the biosparging didn't work and remediation had to take place closer to the Grumman site and Bethpage, would this burden them revert back after a number of years still to Occidental to pick up the tab?

MR. SCHARF: That's an enforcement issue.

MR. LYNCH: I would say this Vinylchloride plume has been identified with the Ruco
site, and the responsibility for that
Vinylchloride--

MR. PFAENDER: Whatever need to be done.

MR. LYNCH: Occidental will be the potentially responsible party for that.

MR. SCHARF: And keep in mind there are other contaminants that knows no bounds, and they came from Occidental, and a lot more came

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have in place.

from the Navy and Grumman site, that is along commingled. So that's under the Grumman facility. Right now Grumman is treating for all of that, we know that's moving off their site, and that's something that you have to keep in mind that's all been an issue in dealing with the regional remedy, and that's based on the remedy for the regonal ground water the state will present that will rectify all that because it will make sure that it will protect the health and environment with those remedies we

MR. ARMENTANO: John Armentano.

With the biosparging is there a depth threshold? These are organisms that are breaking down the VCMs. Is there a depth threshold that they can survive at?

MR. SORENSON: I'm Kent Sorenson, I'm with the Idaho National Engineering Environmental Lab, I'm an environmental engineer.

Surprisingly, it's been in the last ten years that there's been a lot of research on subsurface microbiology an what sort of

organisms can live underground. It's actually been discovered, primarily by researchers at Cornell, that these microorganism can live as deep as 3,000 feet or more below land surface, so they can live very deep, and there is evidence at this site that there is biological activity at least to the bottom of the plume where wells are completed. So you're not going to run into a depth limitation from a biology standpoint.

MRS. TREDER: I'm Karen Treder from the New York State Department of Motor Vehicles.

We have a facility in Hicksville, presently in the Hicksville-Bethpage ares.

On 52 of the map where it says Plant 5B has any water or soil samples been taken in that area?

MR. LYNCH: Yes, there have been water samples that have been taken deep below that area, and the plume of contamination does extend underneath that area.

MRS. TREDER: Is it vinylchloride?

MR. LYNCH: No; this would be the plume

containing the perchlorethylene and the tri-

were soil samples collected around Plant 2, even prior to that.

MRS. TREDER: I'm talking about the west side.

years ago for Plant 2, as part of that there

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MR. GILDAY: Yes, yes; on all sides of the plant.

And prior to that there was a lot of soil sampling and I know soil vapor sampling. One of the things with PCB, it's a volatile chemical, and if you have significant, what we call source areas, by sniffing the gas, basically, you can put a probe down in the ground and you can sniff, you don't sniff it physically, but maybe some people do, but you actually take specific types of chemistry, if you find it in the soil vapor you will know that you have a source near there and then you take the soil samples and find the actual source. That was done in conjunction with soil sampling around the Plant 2 facility, around Plant 5, actually across many of plants on the property. So there's been a lot of different samplings done.

As part of the closure, those plants are going to be used by Grumman for awhile. When they're ready to close those out there will be another round of sampling at that area.

If there was a source area, it's been remediated. If it was near the surface, if

3 been remediated. If it were deeper, and I don't 4 believe there were any deeper things there with 5 respect to soil sampling, north of there there's 6 an area of leach pools that served Plant 5, and 7 that contamination has been remediated at least 8 down to 10 foot depth and backfilled. ٠9 going to be noted in one of the deed.restric-10 tions that I mentioned earlier for the Plant 5 11 closure.

So the state has looked at it, we're satisfied with the work that's been done, with the controls that are going on.

MRS. TRADER: (Indistinct)

MR. GILDAY: Yes; as those pools are closed they will. But right now there part of actually the IRM.

MRS. TRADER: What's the IRM?

MR. GILDAY: That's the containment of the large plume at the southern boundary, the pumping wells.

MS. ECHOLS: Can we take a five minute break for the stenographer?

MR. DEVINE: I just want to ask a

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questions on the vinylchloride I would

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appreciate it.

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MR. LYNCH: It would be the plume of

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contaminated water that lies below granite.

MR. SCHARF: And keep in mind, too, that the magnitude of this site, in terms of depth, width, the concentration varies greatly, and it took me a long time to get all the information as a layperson looking at this, what it all means, so there's a lot involved here and it's is not an easy task to understand all the information. But when we say 2,000 acres, it's basically the extent of the groundwater contamination we found, starting at Occidental, the Ruco facility and going all the way down past the Bethpage Water District.

VOICE: For the next hearing related to the Grumman property, will there been another mailing similar to the one you put out this time?

What we'll have to do is MR. SCHARF: coordinated with the EPA, because I'm starting to draft a news letter, and we'll have to put a mailing out, and it gets quite extensive. is, we have a mailing-- I'm not sure, what did you do with the mailing, did you take a map? MS. ECHOLS:

It was a mailing that was

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CERTIFICATE

I, JULES REHFIELD, a Shorthand
(Stenotype) Reporter and Notary Public
of the State of New York, do hereby
certify that the foregoing
Proceedings, taken at the time and
place aforesaid, is a true and correct
transcription of my shorthand notes.

I further certify that I am neither counsel for nor related to any party to said action, nor in any wise interested in the result or outcome thereof.

IN WITNESS WHEREOF, I have hereunto set my hand this 18th day of August, 2000.

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